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# The Recent Behaviour of the Personal Savings Rate

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# THE RECENT BEHAVIOUR OF THE PERSONAL SAVINGS RATE IN CANADA

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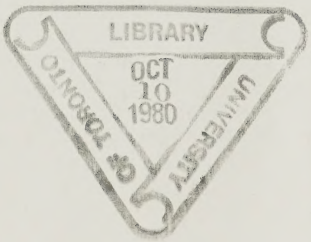
April, 1980.

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PREFACE

During the 1970s, a dramatic change has occurred in personal savings behaviour in Canada. Personal saving climbed from 5.3 per cent of personal disposable income in 1970 to a peak of 10.9 per cent of personal disposable income in 1975, and the currently-estimated personal savings rate for 1979 remains above 10 per cent. This paper analyzes a number of the factors responsible for the sharp increase in the personal savings rate in the first half of the 1970s, and for its continuation at historically high levels since 1975. The paper focusses particularly on the effects on the personal savings rate of the acceleration in inflation in the early part of the 1970s.

The paper examines a number of specific linkages between inflation and personal saving. It is shown that specific inflationary responses in the net interest receipts, private pension plan saving and net rents of the personal sector may have contributed slightly more than 2 percentage points to the 3.8-percentage-point increase in the average personal savings rate between 1962-1970 and 1971-1979. The response of the net interest receipts of the personal sector to higher rates of anticipated inflation may alone have accounted for about two-fifths of the increase in the average personal savings rate between these two periods. The paper also emphasizes the importance of considering more general types of behavioural response in personal saving during the 1970s. The attempt by consumers to rebuild real wealth positions eroded by high rates of unanticipated inflation, the effect on consumer confidence of uncertainty about inflation and unemployment, and the tax incentives extended to saving in registered retirement savings and home ownership plans, appear to have been reinforcing factors leading to an increased personal savings rate during the 1970s.

The paper was prepared in the Long Range and Structural Analysis Division under the general direction of Scott Clark, Director of the Division. The paper has benefitted substantially from the comments of other members of the Department of Finance, as well as from discussions with persons in several universities and research organizations - the Economic Council of Canada, Informetrica Ltd., the Institute for Policy Analysis of the University of Toronto and faculty members at Queen's University, Simon Fraser University, and the University of Victoria. The responsibility for the views expressed in this paper, however, rests entirely with the authors.

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## 1. INTRODUCTION

During the 1970s, the Canadian economy experienced a very dramatic change in savings behaviour with the personal savings rate more than doubling, from a level of 5.3 per cent in 1970 to a peak of 10.9 per cent in 1975. Only at one other time during the postwar period did the personal savings rate rise, for a brief time only, to a level even close to that recorded during the 1970s.

The recent change in savings behaviour has been singled out by observers as a prime area of concern in assessing the current and future performance of the Canadian economy.(1) A number of explanations have been offered for the increase in personal savings rates, including changes introduced in the tax treatment of saving(2), changes in home-ownership patterns(3), and the growing importance of contractual saving in the overall saving of Canadian households.(4) What is striking, however, when observing this change in savings behaviour, is the close relation between the rapid increase in the personal savings rate during the first half of the 1970s and the acceleration in inflation that characterized this period. In fact, over most of the postwar period there has been a fairly close positive relationship between changes in the personal savings rate and changes in the rate of inflation.

On the basis of the observed relationship between savings and inflation rates over the last 30 years, a continuation of high rates of inflation would imply that the personal savings rate would likely remain at the historically high levels recorded during the 1970s. The purpose of this paper, therefore, is to examine the evolution of personal saving and its major components during the 1970s, with a view to isolating major factors contributing to the rise in the personal savings rate during this period. While the paper attempts to deal in a fairly comprehensive way with the various determinants of personal savings behaviour, its central focus is an assessment of the extent to which the increase in the personal savings rate in the first half of the 1970s, and its continuation at historically high levels since 1975 can be attributed to the inflationary environment that characterized this period. A distinction is made throughout the discussion between the effects of an inflation that is steady and fully anticipated, and an inflation that is variable and partially unanticipated.

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(1) See Economic Council of Canada, Sixteenth Annual Review: Two Cheers for the Eighties, Supply and Services Canada, Ottawa, 1979, ch. 2; and C.S. Samur, W.D. Jarvis, and M.C. McCracken, Analysis of the Recent Behaviour of the Personal Savings Rate, Informetrica Limited, Ottawa, February 1979.

(2) See C.D. Howe Research Institute, Policy Review and Outlook, 1979: Anticipating the Unexpected, a staff report, 1979, p. 104.

(3) See Economic Council of Canada, op. cit., pp. 19-22.

(4) See Samur, Jarvis, and McCracken, op. cit., pp. 16-29.

The paper starts out in Section 2 with a brief historical overview of the behaviour of the personal savings rate, and a description of the concepts and data used in the measurement of personal saving. Sections 3 through 5 then examine various specific linkages between inflation and the measured personal savings rate that can be expected to exist as a result of inflationary effects in capital, labour and housing markets, respectively. A common element in this discussion is the effect of anticipated inflation on nominal interest rates. The existence of inflation premiums in the nominal interest earnings on financial assets held by the personal sector, and in the nominal interest payments on the financial liabilities of the personal sector such as mortgages, is shown to affect systematically the measured personal savings rate.

Section 3 examines the role of inflationary expectations in capital markets, and introduces the concept of inflation premiums built into nominal interest payments and receipts. These premiums, which are intended to compensate creditors for the anticipated reduction in the real value of principal, vary directly with the anticipated rate of inflation. Because of this, and because these premiums are built into nominal interest rates to maintain the real value of assets, their existence can be expected to lead to a higher measured savings rate than in situations where there are no inflation premiums. Estimates are presented of the effect of higher expected rates of inflation on the size of these premiums. Increased inflation premiums are shown to represent a very significant factor in the overall increase in measured saving, and account, on average, for about two-fifths of the increase in the average personal savings rate between the two periods 1962-1970 and 1971-1978.

Section 4 describes the concepts for measuring personal saving in the form of pension fund assets, and examines the evolution of this type of saving, which, in 1978, accounted for almost one-half of total net personal saving. Pension plan saving in the forms of contributions made by employers to private pension funds, and the investment income credited to pension fund assets, is shown to have accounted for a rapidly increasing share of personal disposable income since 1970. As such, increases in pension plan saving represent an important source of the increase in the measured savings rate during this period.

Important linkages are established between inflation and both types of pension plan saving. In the case of anticipated inflation, interest earnings on pension fund assets are again subject to the effects of inflation-induced interest premiums. In addition, it is argued that the effects of higher rates of anticipated and unanticipated inflation on relative real rates of return since 1970 have caused pension funds to place a greater proportion of their assets into fixed-income securities and a lesser proportion into equities. The growth in assets thus shows up more in the form of investment income and less in the form of capital gains. While investment income is included in the national accounts concept of personal saving, capital gains are excluded from this concept. In the case of employer contributions to pension plans, higher rates of unanticipated inflation are shown to affect funding requirements by depressing real returns on assets and/or increasing

liabilities where pension benefits are tied to increases in wage and salary levels. Higher rates of unanticipated inflation, and greater variability of the inflation rate, may also have led to increased pension saving by promoting both the introduction of improved benefits in existing plans and the creation of new plans as a partial hedge against inflation.

Section 5 describes the concepts applying to personal sector housing transactions, and examines some of the detailed effects of these transactions on the measured savings rate. The net rental income of the personal sector, much of which is imputed rent on owner-occupied housing, is shown to have recorded a rapid absolute decline since 1971, and this decline can be linked to the higher rates of inflation experienced during this period. One effect is through the increased inflation premiums built into mortgage interest costs as a result of higher expected rates of inflation, an effect on the outlay side that is analogous to the premiums built into interest receipts on the income side of the personal sector. A second linkage of inflation - both anticipated and unanticipated - to net rental income is through the controls on increases in market rents that existed in this period. This limit on increases in market rents caused a narrowing of the gap between rents and inflating housing expenses, and thus placed a squeeze on net rental income. Overall, housing transactions are shown to have contributed only marginally to the increase in the average measured savings rate between 1962-1970 and 1971-1978.

The above effects of anticipated and unanticipated inflation on the personal savings rate are estimated to have explained, in total, slightly more than one-half of the overall increase in the average measured savings rate between 1962-1970 and 1971-1979. Higher rates of anticipated inflation alone accounted for about two-fifths of the overall increase. However, while these specific linkages are major explanatory factors in recent savings behaviour, they do not explain all of the increase in the average personal savings rate that has occurred since 1970. Section 6 broadens the scope of the discussion, therefore, to examine more general behavioural factors that may have been important in leading to the sharp increase in the savings rate during this period. This general examination of the determinants of personal saving identifies three types of behavioural response which are likely to have affected savings behaviour, and through which the inflationary environment of the 1970s is likely to have exerted additional impacts. These responses involve the effects of: (i) changes in the real value of financial assets held by the personal sector; (ii) changes in individuals' expectations about the real rates of return on saving; and, (iii) changes in individuals' perceptions about the degree of uncertainty associated with various consumption and savings decisions.

Evidence is presented to the effect that the erosion of personal-sector wealth and the heightened uncertainty associated with higher rates of unanticipated inflation in the period since 1970, caused consumers to respond by saving more of their disposable income. The rate-of-return effects of higher rates of anticipated and unanticipated inflation are argued to have exerted, in general, a discouraging effect on personal saving, although these effects were offset, at least partially, by several tax advantages extended to personal saving during this same

period. Overall, the general behavioural impacts of higher rates of inflation, particularly through wealth and uncertainty effects, are argued to have contributed to the higher personal savings rate during the 1970s.

The conclusion of the paper is that a combination of factors helps to explain the higher personal savings rate recorded since 1970. Working through effects on net interest receipts, the higher level of anticipated inflation after 1970 is estimated to explain about two-fifths of the increase in the average personal savings rate between 1962-1970 and 1971-1979. Working through effects on net interest receipts, employer contributions to private pension funds, and net rents earned in the personal sector, higher levels of anticipated and unanticipated inflation after 1970 are estimated to explain slightly more than one-half of the increase in the average personal savings rate between 1962-1970 and 1971-1979. The remaining increase in the savings rate appears to have resulted from general behavioural responses to the greater variability and partially unanticipated nature of inflation, the uncertainty created by high rates of unemployment, greater tax incentives offered to saving, and various demographic developments during this period.

## 2. OVERVIEW OF THE BEHAVIOUR OF THE PERSONAL SAVINGS RATE, AND CONCEPTS AND DATA USED IN THE MEASUREMENT OF PERSONAL SAVING

This section describes the behaviour of the personal savings rate in Canada since 1950, and its relation to the rates of inflation experienced during this period. Comparative historical data are also provided for several member countries of the Organization for Economic Cooperation and Development (OECD). Subsequently, a brief discussion is presented of the concepts and data used in the measurement of personal saving in the Canadian system of national accounts.

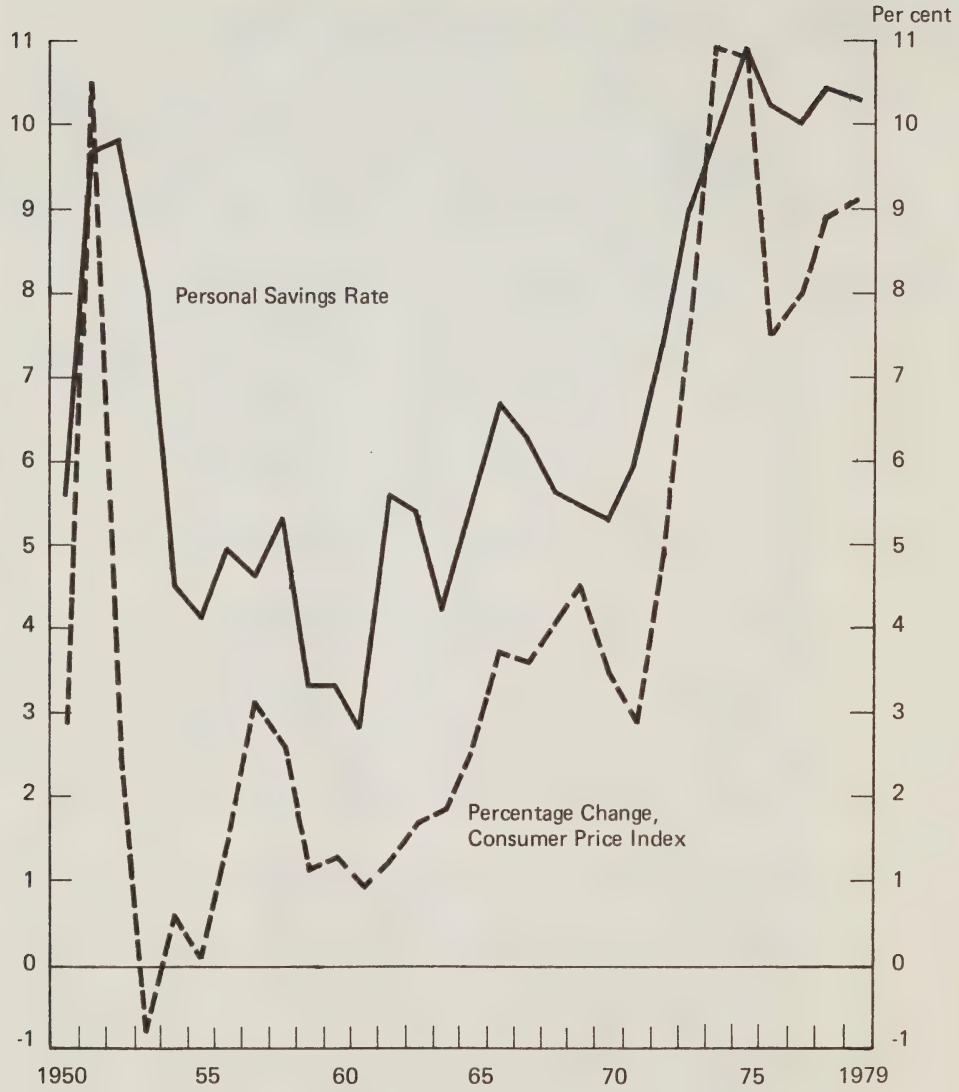
### 2.1 Personal Savings and Inflation Rates in OECD Countries

Chart 1 plots the relative movements in the personal savings rate and the rate of inflation in Canada during the period 1950-1979. The sharp increase of the personal savings rate since 1970 is apparent from the chart, as well as the high rates of inflation recorded during this same period. In fact, three distinct periods stand out in the relative movements of inflation and savings rates in Canada. There is, first, the long period of relative price stability, between 1953 and 1961, during which prices rose on average about 1.2 per cent per year. This was accompanied by a steady fall in the personal savings rate from a peak of 9.8 per cent in 1952 to 2.8 per cent in 1961. The average personal savings rate during this period was 4.7 per cent. Second, there is the period of moderately accelerating inflation between 1962 and 1970, during which average annual inflation rates increased by 1.7 percentage points compared to the earlier period. The average personal savings rate, for its part, was 0.9 percentage points higher than in the earlier period. Finally, there is the period of rapidly accelerating inflation since 1970, during which the average annual inflation rate was 4.9 percentage points higher, and the average personal savings rate was 3.8 percentage points higher, than during the 1960s.

Table 1 presents comparable data on average inflation and savings rates in selected OECD countries over selected historical periods. Large differences can be seen between the savings rates in the various countries. Some part of these differences can be ascribed to factors such as savings habits, the scope and methods of funding of social security schemes, the kinds of national accounting data bases available in the various countries, and the application of national accounting conventions to these data. Despite the differences in savings rate levels, however, the savings rates in most of these countries tended to increase steadily after 1970. The table also shows the higher rates of inflation recorded in each of the selected OECD countries during this same period. Among the countries, only West Germany failed to experience an increase in the personal savings rate over the periods examined, a fact that might be ascribed, in part, to the relatively low rate of acceleration of inflation experienced in that country since the mid-1960s.

Chart 1

The Personal Savings Rate, and the
Percentage Change in the Consumer Price Index, Canada,
1950-1979




Source: Statistics Canada, *National Income and Expenditure Accounts,* Cat. 13-201, and *Consumer Prices and Price Indexes,* Cat. 62-010.

Table 1

Average Personal Savings Rates and Average Annual Changes in Consumer Price Indexes of Selected OECD Countries, Selected Periods, 1960-1976 (per cent)

| | 1960-1970 | | 1973-1976 | |
|---|---|---|---|---|
| | Savings Rate | Inflation Rate | Savings Rate | Inflation Rate |
| Canada | 5.1 | 2.6 | 10.0 | 9.2 |
| United States | 6.0 | 2.6 | 7.1 | 8.0 |
| Japan | 18.5 | 5.5 | 22.0 | 14.2 |
| France | 7.3 | 4.0 | 9.3 | 10.5 |
| West Germany | 16.4 | 2.5 | 13.9 | 6.1 |
| United Kingdom | 8.1 | 3.7 | 13.7 | 16.4 |
| Italy | 11.6 | 3.8 | 18.0 | 15.9 |

Source: Organization for Economic Cooperation and Development, National Accounts of OECD Countries, and International Monetary Fund, International Financial Statistics.

It should be noted, in the case of recent United States (U.S.) experience, that the inflation and savings rate comparisons are very sensitive to the time periods chosen. Personal savings rates in the U.S. have recently been 2 to 3 percentage points lower than the average rate of 7.1 per cent recorded for the period 1973-1976, despite the recurrence of high rates of inflation in the past two years. As such, current savings rates in the U.S. are significantly below the average level recorded in the period 1960-1970. It is difficult to state precisely the reasons for the recent divergence of U.S. and Canadian savings behaviour, if only because the movement of the U.S. personal savings rate is itself subject to a number of conflicting interpretations.(1) A listing of some factors that may have been at work is instructive, however, in terms of subsequent discussion of the determinants of Canadian savings behaviour.

Cyclical factors appear to have been important: the recent spread of 5 to 6 percentage points between Canadian and U.S. savings rates compares with an average spread during the 1970s of a little over 2 percentage points. Canadian households recorded much higher real disposable income gains than their U.S. counterparts from 1970 to 1976, as the

(1) See D. Steiner, "Consumer Sentiment", DRI Consumer Business Review, Data Resources Inc., Lexington, Massachusetts, Fall, 1978, and W. Springer, "Has the Slowdown Begun?", DRI Consumer Business Review, Spring, 1979, for a review of recent developments in U.S. personal savings behaviour.

Canadian economy operated closer to potential capacity and labour's share of value added declined less rapidly than in the U.S. The cyclical upswing in real personal disposable income in Canada may have contributed to the closing of the negative spread between Canadian and U.S. savings rates in the period 1970-1972, and to the opening up of the positive spread between these rates in the period 1973-1975.(1) The spread between Canadian and U.S. savings rates continued to widen after 1975, as the Canadian rate stabilized above 10 per cent, and the U.S. rate declined rapidly from 7.7 per cent in 1975 to 4.5 per cent in 1979. The relative movement of U.S. and Canadian unemployment rates appears to have been an important cyclical factor in this latter period, as U.S. unemployment rates recorded a substantial decline throughout the period 1975-1979, whereas Canadian unemployment rates increased steadily from 1975 to the early part of 1978. Low and declining unemployment rates in the U.S. may have improved the sentiment of American consumers, and contributed to the decline in the U.S. personal savings rate after 1975.(2)

A second factor in the divergence of U.S. and Canadian savings behaviour is the fiscal and institutional arrangements that apply in the two countries to the receipt and payment of interest. Since 1966, U.S. regulatory agencies have placed interest rate ceilings on the deposit liabilities of financial institutions, with a view to sustaining the mortgage lending activity of thrift institutions, such as savings and loan associations. Under the terms of the regulations, thrift institutions benefit from slightly higher deposit rate ceilings than commercial banks. These ceilings have tended to reduce the real return on savings placed on deposit during the recent inflationary period, as nominal deposit rates were unable to adjust fully to the higher rates of inflation that prevailed.(3) Moreover, U.S. taxpayers do not benefit from an interest and dividend income deduction of the type enjoyed by their Canadian counterparts. At the same time, U.S. tax law allows for the deductibility of interest payments on mortgages, consumer credit and personal loans, so that as nominal interest rates rise in the face of higher rates of inflation, the cost of personal borrowing is lowered in real terms by the combined effect of the tax deductibility provisions

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(1) Where savings decisions are based on trend rates of growth of real income, purely cyclical gains (losses) in real income tend to be "smoothed out" by temporary increases (decreases) in the savings rate. See Section 6.2 for a more detailed discussion of such effects.

(2) See Section 6.4 for a detailed discussion of uncertainty effects on savings behaviour.

(3) Regulatory changes introduced in June 1978, particularly the authorization of the issuance by depository institutions of six-month money market certificates, facilitate the adjustment of deposit rates to higher rates of inflation. Thrift institutions are allowed to pay nominal yields on these certificates that are pegged to the discount rate on six-month Treasury Bills.

and the shrinkage in the real debt.(1) Therefore, both institutional and fiscal factors limit the incentives to increased personal saving in the U.S. compared to Canada, and the differential widens at higher rates of inflation. Finally, although the U.S. has recently introduced more comprehensive tax sheltering of individual retirement savings, the general popularization of registered retirement pension plan saving in Canada since 1970 appears to have been an additional fiscal factor contributing to the divergence of Canadian and U.S. savings behaviour during the 1970s as a whole.(2)

Two additional, and related, factors should also be mentioned as possible contributors to the recent declines in U.S. personal savings rates. First, survey research indicates that large numbers of American consumers adopted, until very recently, "buy-in-advance" attitudes, whereby spending on costly durables was advanced in time in order to avoid expected future price increases.(3) The prevalence of buy-in-advance attitudes depends crucially on the expectation that future nominal income gains will outpace future rates of inflation; the rapid decline in U.S. unemployment rates after 1975 probably contributed to the formation of such expectations. Second, the sustainability of these attitudes depends, in turn, on the availability of credit to finance the advanced purchases, so that buy-in-advance purchases were mirrored by an increase in consumer debt burdens to postwar high levels. As the U.S. unemployment rate begins to notch up in the coming year, and American consumers feel the need to rebuild their liquidity positions, observers look for some retrenchment in the future pattern of U.S. consumer spending.(4) Again, therefore, some part of the current divergence in U.S. and Canadian savings behaviour appears to derive from differences in the cyclical positions of the two economies.

## 2.2 The Measurement of Personal Saving in Canada

An examination of the concepts and statistical data used to measure personal saving is a necessary starting point to any analysis of the savings behaviour of Canadian consumers. The personal sector in the Canadian system of national accounts is defined so as to bring together the transactions of individuals in their capacity as final consumers. However, as a result of the necessarily high level of aggregation, the scope of the sector extends somewhat beyond the everyday concept of "persons" as such, to include private non-commercial institutions such as labour unions and universities, private pension funds, and certain insurance company transactions. In addition, the personal sector also includes the transactions of unincorporated business enterprises, because of the difficulty of separating personal withdrawals from retained earnings in such businesses. Personal-sector income is deemed

(1) Section 3 introduces the concept of inflationary premiums in interest payments and receipts, and Section 6.3 discusses the effect on savings decisions of their tax treatment.
(2) Section 6.3 discusses in more detail the effect of the tax advantages offered to personal saving in Canada.
(3) See Springer, ibid., p. 17.
(4) See Steiner, op. cit., p. 28, and Springer, op. cit., p. 9.

to include all income earned by unincorporated businesses, with the result that estimates of personal saving contain some unidentifiable amount of business retained earnings.

Saving by the personal sector is defined in the national accounts as being equal to personal disposable income less personal consumption expenditures, less transfers (e.g., remittances abroad) to other sectors. The personal savings rate then expresses this measure of saving as a percentage of personal disposable income. Some of the weaknesses of personal savings data drawn from the national accounts are already well known, and are discussed in detail in the Statistics Canada Guide to the Accounts.(1) These include: the residual nature of the personal savings estimates; the frequency and magnitude of revisions that are made to the data as new statistical benchmarks become available; and the arbitrary assignment of all of the gross national product (GNP) residual error term in the sectoral savings accounts to the corporate savings estimates.

These weaknesses are graphically illustrated by the major revisions to the national accounts estimates which Statistics Canada has made in the 1970s. For example, Statistics Canada's first estimate of the 1971 personal savings rate, made in 1972, was 8.5 per cent. As a result of subsequent revisions to the national accounts estimates, in particular the revisions made in 1976 and 1977, the 1971 personal savings rate is now estimated to have been 5.9 per cent. More recently, the 1978 estimate of the personal savings rate has already been subject to downward revision from the preliminary estimate of 10.9 per cent, to the currently-estimated level of 10.4 per cent. It is conceivable that this estimate will be subject to further revisions into the early 1980s, as new benchmarks become available from taxation and census statistics.

It is reasonable to expect that these factors have affected the reliability of the savings data uniformly over time regardless of the existence or otherwise of inflation in the economy. As such, they do not provide a systematic explanation of the rapid run-up in the personal savings rate since 1970. However, increasing attention is now being focussed on a number of specific factors that may systematically affect measured saving in inflationary periods. Three such factors are discussed below. Section 3 examines the treatment of interest receipts and payments in the incomes and outlays of the various sectors of the economy. Section 4 examines the treatment of the transactions of trusteed pension funds in the personal sector accounts. Finally, in Section 5, the treatment of rents on residential housing is examined, and particularly the use in the national accounts framework of a synthetic owner-occupied housing account, in which net imputed rents are included on the income side of the personal sector accounts. An attempt is made for each of these factors to derive an approximate estimate of the impact of inflation on the measured savings rate since 1970. These estimates indicate that the increase in the average rate of inflation between 1962-1970 and 1971-1979 may have accounted for slightly more than one-half of the increase in the average personal savings rate between these two periods.

(1) Statistics Canada, National Income and Expenditure Accounts Volume 3, Cat. 13-549E.

## 3. THE EFFECTS OF INTEREST RECEIPTS AND PAYMENTS ON THE MEASURED SAVINGS RATE DURING INFLATIONARY PERIODS

In the existing national accounts framework all interest income received by persons is included in the interest and miscellaneous investment income component of national income. Interest income receipts include such items as bond and mortgage interest received by or accruing to persons, interest on deposits with chartered banks, the investment income received on behalf of persons by life insurance companies and trusteed pension plans, and interest and dividend payments to persons from non-residents. In the income and outlay accounts, these receipts appear on the income side of the personal sector, and on the outlay sides of the business and non-resident sectors. Interest payments made by the personal sector on mortgage and consumer debt appear as an outlay of the personal sector, either implicitly in the case of mortgage interest payments (which affect personal expenditure on goods and services through their effect on gross paid and imputed rents), or explicitly in the case of interest on consumer debt as a transfer to the corporate sector.

What is important for the present discussion is that these receipts and payments are recorded in nominal terms, so that in a situation where nominal rates of interest adjust to higher expected rates of inflation to maintain the level of the real rate of interest, there exists the problem of how to treat and distinguish the real and inflation-induced components of interest receipts and payments. Analogous problems of inflation accounting in the measurement of corporate profits and the rate of return on capital have already been subjected to extensive study, but only recently have similar approaches been applied to the measurement of saving.(1)

In theory, it should be the case that an increase in the expected rate of inflation, which is fully compensated for by an increase in the nominal rate of interest so as to maintain the real rate of interest unchanged, should not affect the level of saving.(2) The real wealth

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(1) See, for example, Gregory V. Jump, "Inflation-Related Spurious Elements in Measured Savings of Various Sectors of the Economy: The Canadian Experience 1962-77", Institute for Policy Analysis, University of Toronto (mimeo), March 1979, and Jeremy J. Siegel, "Inflation-Induced Distortions in Government and Private Saving Statistics", Review of Economics and Statistics, Vol. LXI, no. 1, February 1979.

(2) Where interest income receipts are subject to personal income taxation, this statement should be interpreted as referring to the real net-of-tax rate of interest. See Section 6.3 for a discussion of the effects of personal and corporate taxation on real rates of return in an inflationary environment.

of the personal sector is unchanged, as is the willingness of persons to postpone present consumption in exchange for future consumption. However, while real consumption and savings choices are unchanged, measured personal disposable income in the national accounts will rise relative to consumer outlays in the usual case where the personal sector holds more interest-bearing assets than liabilities. This will then show up as an increase in measured saving.

This observation is consistent with the data presented in Table 2, showing the steady increase in the share of interest receipts in personal income that has occurred in the inflationary period since 1970. Part of this increase has resulted from a change in the composition of financial assets held in the personal sector and, as discussed below in Section 6, this portfolio shift may itself have represented a response to higher rates of anticipated and unanticipated inflation. It is reasonable to presume, however, that some part of this increase can also be attributed to the adjustment of nominal interest rates to higher expected rates of inflation.

In effect, the premiums that are built into nominal interest receipts due to anticipated inflation represent an offset to the anticipated erosion in the real value of personal wealth. The premiums are picked up in the national accounts as an increase in measured saving, even though the real value of net wealth in the personal sector is effectively unchanged by this measured increase in saving.(1) Since the amount of the premiums will depend on anticipated rates of inflation and the stock of net interest-bearing assets held by the personal sector, a valid comparison of savings behaviour between periods characterized by different expected rates of inflation would require, strictly speaking, that such amounts be excluded from the personal income account and reallocated to the incomes of the sectors from which they originate.(2)

Not surprisingly, the adjustment of measured savings data to exclude such items would pose formidable problems and, in practice, would require a series of fairly arbitrary assumptions about the formation of inflationary expectations and the market valuation of assets. While the magnitude of the necessary adjustments could vary substantially with changes in the underlying assumptions, the steady increase over time in the relative importance of interest receipts, shown in Table 2,

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(1) If inflation is not fully anticipated, real net wealth will decline and measured saving is likely to increase to offset all or part of the erosion in real wealth. In this case, however, the increased saving does have the effect of changing the real value of net wealth. See Section 6.2 for a discussion of the wealth effects of unanticipated inflation on personal savings behaviour.

(2) The strict approach of excluding inflationary interest premiums from personal income is consistent with the well-known Haig-Simons definition of income as consumption plus the net accretion in wealth, where wealth is measured in terms of real purchasing power. See Robert M. Haig, "The Concept of Income - Economic and Legal Aspects", in Robert M. Haig (ed.), The Federal Income Tax, Columbia University Press, New York, 1921, and Henry C. Simons, Personal Income Taxation, University of Chicago Press, Chicago, 1938.

points to the fact that some of the increase observed in the measured personal savings rate since 1970 may simply be due to the impact of inflation on nominal interest receipts and payments.

Table 2

Share of Interest Receipts in Personal Income, 1961-1978 (per cent)

| | Total Interest and Miscellaneous Investment Income as Percentage of Personal Income |
|---|---|
| 1961 | 5.67 |
| 1962 | 5.79 |
| 1963 | 5.93 |
| 1964 | 6.04 |
| 1965 | 5.91 |
| 1966 | 5.83 |
| 1967 | 5.77 |
| 1968 | 5.94 |
| 1969 | 6.08 |
| 1970 | 6.36 |
| 1971 | 6.30 |
| 1972 | 6.38 |
| 1973 | 6.50 |
| 1974 | 7.00 |
| 1975 | 7.04 |
| 1976 | 7.71 |
| 1977 | 7.70 |
| 1978 | 8.20 |

Source: Statistics Canada, National Income and Expenditure Accounts, Cat. 13-201.

In order to determine a rough order of magnitude of the contribution of changes in the expected rate of inflation to the overall increase in the level of interest receipts, a regression equation has been used to explain interest receipts as a function of the stock of interest-bearing assets held by the personal sector, and a measure of the expected inflation rate.(1) The estimated coefficients of the regression equation imply that higher expected rates of inflation after 1970 caused an average additional inflation premium of about $1.6 billion a year to be built into net interest receipts during the period 1971-1978. Since it is based on holdings of net interest-bearing assets, this estimate of the increased premium received by the personal sector measures the net effect of the increased interest receipts on assets and the increased interest payments on liabilities, such as mortgages. The estimated additional premium accounts for 1.5 per cent of the average level of personal disposable income during the period 1971-1978. If inflation were to continue at a rate comparable to that recorded during the

(1) The estimation of the additional inflation premiums built into interest receipts after 1970 is described in detail in Appendix A.

1970s, the existence of these inflation premiums in interest receipts would be a factor preventing the measured personal savings rate from declining to more normal historical levels.(1)

(1) This impact of expected inflation on measured personal saving also has direct implications for the measured saving of other economic sectors. The impact of expected inflation on measured saving through interest premium effects will be positive for net creditor sectors (i.e., persons and non-residents), and negative for net debtor sectors (i.e., government and business). The impact on the aggregate saving of all sectors combined cancels to zero, however, and in this sense real saving in the economy as a whole is unchanged by steady and fully anticipated inflation.

## 4. THE EFFECTS OF THE TRANSACTIONS OF TRUSTEED PENSION PLANS ON THE MEASURED SAVINGS RATE DURING INFLATIONARY PERIODS

It is widely recognized that pension saving has assumed an increasingly important role in recent years in personal saving. In part, this can be associated with the steady increase that has taken place since the mid-1950s in the coverage of employer-sponsored pension plans. In 1978, for example, personal-sector saving with trusteed pension plans and life insurance companies, the institutions largely identified with private pensions, amounted to $7.9 billion.(1) This figure accounted for 5.2 per cent of personal disposable income in that year. By comparison, the amount of this type of saving in 1962 was $1.2 billion, or 4.0 per cent of personal disposable income.(2) While it will become clear in the discussion that follows that an important component of measured pension saving - the investment income credited to pension funds - is subject to inflationary effects that are identical to those already discussed in the previous section, the sheer size of this component of saving warrants a broader examination of the treatment of the relevant transactions in the national accounts, and the impact of inflation on this component of measured saving.(3)

The basic convention adopted in the national accounts is that the transactions of pension funds which are either trusteed or funded by an insurance company are included in the personal sector.(4) As a result

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(1) This estimate of pension saving includes some, but not all of saving in the form of registered retirement savings plans (RRSPs). The financial flow accounts from which the estimate is taken do not permit an estimate to be made of the amount of RRSP saving picked up in the pensions and life insurance category of the accounts.

(2) Note that while the "pension savings rate" increased over this period, the share of pension saving in total net personal saving was actually declining, from about 71 per cent in 1962 to about 46 per cent in 1978. The decline was caused by other types of personal saving increasing even more rapidly than pension saving.

(3) This section draws heavily on a background technical study, Pension Plans and Personal Savings - A Review of the Concepts of Pension Savings in the Canadian System of National Accounts, Long Range and Structural Analysis Division, Department of Finance, August 1979.

(4) The organization or group of individuals which provides for the accumulation of pension fund assets and the subsequent payment of benefits, is known as the funding agency. Funding agencies include insurance companies, trust companies, and individuals acting as trustees. Where the funding agency is a trust company or individuals acting as trustees, a pension plan is classified as a trusteed plan. Pension plans using the facilities of insurance companies are classified as insured plans. Public service plans in which contributions are paid into federal or provincial consolidated revenue funds, and used for general government purposes, are classified as government consolidated revenue funds. These plans (CRF plans) as well as the Canada/Quebec Pension Plan (C/QPP) are included in the government sector.

of this treatment, contributions to a pension plan by an employer are considered as a form of supplementary labour income and hence are included in the national accounts concept of personal income. Contributions to a pension plan by an employee are considered simply as a component of wages and salaries. Since both employer and employee contributions represent components of personal disposable income which are not consumed, these contributions then flow through into the national accounts estimate of personal saving. Similarly, the financial assets accumulated in private pension plans give rise to investment income, which is included as a component of the interest, dividends, and miscellaneous investment income of the personal sector, and which again flows through into the estimate of personal saving.

With these conventions in mind, it is now possible to examine the extent to which the operations of pension plans affect the main aggregates of personal-sector income and saving during inflationary periods. For example, as described above, employer contributions to pension plans are part of the national accounts estimate of wages, salaries, and supplementary labour income. If these contributions have increased faster than total personal disposable income since 1970, then this would constitute one source of the increase in the measured personal savings rate over this period.

The first column of Table 3 lists employer contributions to trusteed pension plans as a share of personal disposable income over the period 1960 to 1978. The data indicate that employer contributions as a share of disposable income have more than doubled in importance over this period, increasing from 0.9 per cent in 1960 to 2.1 per cent in 1978. The period 1970 to 1978 witnessed a particularly marked increase in the ratio of employer contributions to disposable income. About 70 per cent of the increase in the ratio has occurred since 1970.

Three reasons appear to explain the increasing ratio of employer contributions to disposable income. First, pension plans have become more widespread over the period. In 1960, some 39 per cent of paid workers in the labour force were members of employer-sponsored pension plans. This ratio rose to 41 per cent by 1964 and remained at about this level until 1973. By the end of 1977, however, membership in pension plans had increased to 47 per cent of paid workers.(1)

Second, in the last few years, many pension plans have extended special retirement benefits, liberalized vesting provisions, and introduced various ad hoc increases in pension payments in the face of unanticipated increases in the rate of inflation.(2) These enrichments of benefits

(1) Data on plan membership are derived from Statistics Canada, Pension Plans in Canada, Cat, 74-401, and labour force data from various issues of Historical Labour Force Statistics, Cat. 71-201.

(2) Special retirement benefits refer to provisions which permit retirement with an unreduced pension before normal retirement age. Vesting conditions provide an entitlement to deferred pension benefits upon completion of a minimum period of service. Ad hoc increases in pension payments occur where the employer periodically reviews his pension program, and adjusts the benefits paid to retired former employees in the light of current inflationary conditions. For a more detailed discussion of concepts and data, see Pension Plans in Canada 1976, ibid.

must have been financed, in many circumstances, by higher employer contributions.

Table 3

Share of Sources of Trusteed Pension Plan Saving in Personal Disposable Income, 1960-1978 (per cent)

| | (A) Employer Contributions | (B) Investment Income | Total (A + B) |
|---|---|---|---|
| 1960 | 0.87 | 0.57 | 1.44 |
| 1961 | 0.93 | 0.65 | 1.58 |
| 1962 | 0.91 | 0.71 | 1.62 |
| 1963 | 1.01 | 0.79 | 1.80 |
| 1964 | 1.04 | 0.84 | 1.88 |
| 1965 | 1.11 | 1.03 | 2.14 |
| 1966 | 1.01 | 0.92 | 1.93 |
| 1967 | 1.10 | 0.95 | 2.05 |
| 1968 | 1.19 | 0.98 | 2.17 |
| 1969 | 1.16 | 1.03 | 2.19 |
| 1970 | 1.22 | 0.87 | 2.09 |
| 1971 | 1.33 | 1.04 | 2.37 |
| 1972 | 1.39 | 1.22 | 2.61 |
| 1973 | 1.47 | 1.23 | 2.70 |
| 1974 | 1.50 | 1.19 | 2.69 |
| 1975 | 1.69 | 1.13 | 2.82 |
| 1976 | 1.80 | 1.29 | 3.09 |
| 1977 | 1.97 | 1.49 | 3.46 |
| 1978 | 2.12 | 1.84 | 3.96 |

Source: Statistics Canada, Trusteed Pension Plan Financial Statistics, Cat. 74-201, and National Income and Expenditure Accounts, Cat. 13-201.

Third, many pension plans have experienced actuarial deficiencies in recent years, either because investment performance was not generally as good as had been assumed, or because salary levels were higher than projected. This occurs because the costs of funding a defined set of benefits are negatively related to the spread between rates of return on pension fund assets and rates of salary increase. Other things being equal, a narrowing of a positive spread or a widening of a negative spread between these two rates increases the costs of funding the plan. Recent experience indicates that revised actuarial assumptions have entailed a narrowing of the positive spread between these two rates(1), thus necessitating additional employer contributions.

In order to focus on the possible effects of a variable and unanticipated inflation on employer pension contributions, it is useful to consider these contributions as consisting of three components: past service

(1) Financial Executive Institute of Canada, Report on Survey of Pensions in Canada, March 1978, pp. 34-36.

contributions, current service contributions, and contributions to meet experience deficiencies. Past service contributions arise when a new plan is established or when existing benefits are improved; in either case, the new level of benefits generally applies retroactively to employees' past service, thereby creating a past service liability which has to be met by increased employer contributions. Current service costs are contributions made to cover liabilities which arise from pensionable service earned during the current year. These will frequently be proportional to the wage bill in plans which build salary increases due to inflation into the actuarial assumptions. Experience deficiencies, as already noted, arise when the actuarial assumptions on which past contributions have been based turn out to be overly optimistic. The rate of return on the fund's investments may be lower than anticipated, or the projected benefits may be higher than originally anticipated on account, for example, of higher-than-expected salary growth or lower-than-expected employee turnover.

Table 4 shows the ratio of employer contributions to disposable income from 1972 to 1978 where the contributions are split between contributions for current service, on the one hand, and contributions for past service and to meet experience deficiencies on the other.(1) Data prior to 1972 are not available. The data indicate that past service contributions as a share of disposable income have risen much faster than current service contributions. The average annual growth rate over the period for current contributions was 3.3 per cent, while that for past service was 19.1 per cent. About two-thirds of the growth in total employer contributions relative to disposable income that took place in the 1970s can be attributed to the increasing role of contributions for past service and to meet experience deficiencies. The variability and partially unanticipated nature of inflation in this period may have contributed to this growth in required employer contributions, through their effect in creating experience deficiencies and in promoting both the introduction of improved benefits in existing plans and the creation of new plans as a partial hedge against inflation.

Table 4

Employer Contributions to Trusteed Pension Plans for Current and Past Service(1) Relative to Disposable Income, 1972-1978 (per cent)

| | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978 |
|---|---|---|---|---|---|---|---|
| Current service | 1.11 | 1.21 | 1.19 | 1.28 | 1.38 | 1.42 | 1.35 |
| Past service | 0.27 | 0.25 | 0.30 | 0.41 | 0.41 | 0.54 | 0.77 |

(1) Past service contributions include contributions to meet experience deficiencies.

Source: Statistics Canada, Trusteed Pension Plans Financial Statistics, Cat. 74-201, and National Income and Expenditure Accounts, Cat. 13-201.

(1) Data distinguishing past service and experience deficiencies are not available. However, both are expected to respond in the same manner to inflation.

It does not appear that a significant reduction in the rate of employer contributions required to meet experience deficiencies can be expected in the near future, given the increased overhang of unfunded pension liabilities that appears to have been created in recent years(1), and which will need to be amortized over future years. In addition to the effect of the overhang already accounted for in actuarial evaluations, a renewed bout of unanticipated inflation could place additional upward pressure on employer contributions both as a result of increased experience deficiencies and as a result of demands for increased pension coverage.

The second major source of trusteed pension plan saving is the investment income that is periodically credited to these plans. The second column of Table 3 shows the contribution of the investment income of trusteed pension plans to personal disposable income during the period 1960 to 1978. The data indicate that pension fund investment income has accounted for a steadily growing share of disposable income, and this growth has accelerated significantly in the period since 1970. The average annual growth rate in the share of pension plan investment income in disposable income was 9.8 per cent in the period 1970 to 1978, compared to an annual growth rate of 4.3 per cent in the period 1960 to 1970.

Part of the relative growth in pension plan investment income since 1970 reflects the growth in employer contributions described earlier.(2) In addition, pension funds have placed a greater proportion of their assets in recent years into high-yielding fixed-income securities and a lesser proportion into equities.(3) The appreciation of pension fund assets thus shows up more in the form of investment income credited to the funds, and less in the form of capital gains on equity holdings.

Finally, part of the increased share of pension fund investment income in disposable income can be ascribed to the effect, described earlier in Section 3, of the adjustment of nominal rates of return to higher expected rates of inflation. The higher nominal returns then serve to some extent to offset the anticipated erosion by inflation of the real value of the fixed-dollar assets of the funds. This particular component of the increase in measured pension saving is thus a specific case of the more general effect of inflation induced interest premiums on measured saving.

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(1) See Financial Executive Institute, Report on Survey of Pension Plans in Canada, March 1978, p. 28.

(2) Employee contributions as a share of disposable income increased modestly after 1970 at an average annual rate of 2.3 per cent, and therefore made an additional, though lesser contribution to the relative growth in investment income.

(3) See Statistics Canada, Trusteed Pension Plan Financial Statistics 1977, Cat. 74-201. Sections 6.3 and 6.4 of this paper discuss the influence of inflation on the composition of personal-sector (including pension fund) portfolios, through rate-of-return and uncertainty effects, respectively.

The combined effect of the switch in portfolio composition and the increase in nominal interest rates was to increase the investment income return on the book value of pension fund assets from 4.6 per cent in 1961 to 8.7 per cent in 1978. As shown in Table 5, most of this increase has occurred since 1970.

Table 5

Trusteed Pension Plan Investment Income as a Percentage of the Book Value of Assets, Selected Years, 1961-1978

| | Ratio of Investment Income to Mean Book Value of Assets (per cent) |
|---|---|
| 1961 | 4.6 |
| 1965 | 5.2 |
| 1970 | 4.5 |
| 1971 | 5.3 |
| 1972 | 6.3 |
| 1973 | 6.5 |
| 1974 | 7.1 |
| 1975 | 6.4 |
| 1976 | 7.0 |
| 1977 | 7.5 |
| 1978 | 8.7 |

Source: Statistics Canada, Trusteed Pension Plans Financial Statistics, Cat. 74-201.

If inflation were to continue at a rate comparable to that recorded during the 1970s, most of these factors would work to prevent a rapid downward adjustment in the measured personal savings rate. It has already been argued that employer contribution rates will be sustained at existing levels by the continuing overhang of experience deficiencies. This, as well as any increase that occurs in pension plan coverage, can be expected to sustain the growth in pension fund assets and the investment income credited to these funds. Continued high inflation would also maintain the interest premiums built into the returns on the fixed-income assets held in private pension portfolios.

The above analysis indicates that both employer contributions to trusteed pension plans and the investment income accruing to these plans have risen substantially relative to personal disposable income since 1970. As shown in Table 3, the share in disposable income of the sum of employer contributions and investment income has increased by more than

1.8 percentage points since 1970, an increase that shows up directly in the measured savings rate.(1) This was almost three times the increase recorded in the previous 10 years.

In order to determine a rough order of magnitude of the contribution of higher rates of anticipated and unanticipated inflation to this overall increase, a projection has been made of the underlying trend in these two components of pension saving based on historical data from 1960 to 1970. The projection indicates that, after allowing for an expansion in pension plan coverage in line with the experience of the 1960s, the impact of the increase in the average rate of inflation between 1960-1970 and 1971-1978 on pension plan saving accounted for about 1 percentage point of the increase in the average personal savings rate between these two periods. About one-half of this overall increase is already included in the earlier estimate of the additional interest premiums earned on personal-sector net assets as a result of higher rates of anticipated inflation.(2) The incremental effect on the measured savings rate of the increased pension saving described here, therefore, is

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(1) Note that the total impact of trusteed pension plans cannot simply be measured by summing the employer contributions and investment income components. Although pension benefits, as a transfer within the personal sector, are not recorded as disposable income, they nonetheless reduce measured saving through their effect in promoting consumption. Pension plan expenditures did, in fact, increase somewhat faster than disposable income after 1970, but since this was almost exactly offset by an increase in employee contributions over the period, the data presented in Table 3 closely approximate the total net impact on saving of pension plan transactions in the income and outlay accounts of the personal sector.

(2) Section 3 indicated that additional interest premiums in the period 1971-1978 added an average of about 1.5 percentage points to the measured savings rate. In this same period, the interest-bearing assets of insurance and pension funds accounted, on average, for 42 per cent of the net interest-bearing assets of the personal sector. Thus, interest premiums on life insurance and pension assets accounted for about 0.6 (=0.42 x 1.5) percentage points of the increase in the measured savings rate over this period. The interest premiums on trusteed pension plan assets alone are obtained by scaling the estimates for life insurance and pension assets by the average ratio of trusteed pension plan assets to the total assets of trusteed and insured plans during the period 1971-1978. The ratio is estimated from data presented in Trusteed Pensions Plans Financial Statistics 1978, op. cit., p. 24, and is approximately 0.76. Therefore, the effect on the measured savings rate of additional interest premiums earned on trusteed pension assets in the period 1971-1978 is approximately 0.5 (=0.76 x 0.6) percentage points.

about 0.5 percentage points.(1) This effect, which is over and above the interest premium effect on measured pension saving, can be ascribed to the higher rate of growth of pension coverage, the need for additional contributions to cover experience deficiencies, the improved benefits introduced in existing plans, and the resulting increases in the income-earning assets of pension funds. All these factors appear closely related to the high rates of unanticipated inflation which were experienced during this period. The large existing overhang of unfunded pension liabilities will be a continuing factor sustaining the personal savings rate, and any resurgence of unanticipated inflationary pressure in the future would serve to reinforce this effect.

(1) The projection method used consists of a regression, based on 1960-1970 data, of the employer contributions ratio shown in Table 3 on the percentage of paid workers in the labour force covered by trusteed pension plans. The coverage variable is projected for each year after 1970 on the basis of the average annual rate of growth of coverage recorded during the period 1960-1970. Insertion of the projected coverage rates into the regression equation yields predicted values for the employer contributions ratio for each year after 1970. The difference between actual and predicted values averages slightly more than 0.4 percentage points during the period 1971-1978. A small additional adjustment is made for the amount of investment income attributable to the difference between actual and predicted employer contributions ratios in the period 1971-1978. The investment income component is computed at the average return on pension fund assets that prevailed during the 1960s in order to net out inflation premium effects. This yields the 0.5-percentage-point estimate presented here.

## 5. THE EFFECTS OF PERSONAL SECTOR HOUSING TRANSACTIONS ON THE MEASURED SAVINGS RATE DURING INFLATIONARY PERIODS

In 1978, the personal sector held about $97 billion in mortgage liabilities, a figure which was more than 25 per cent of the total financial assets held by the sector in that year. Given the influence of expected inflation on nominal interest rates that has already been described, and given the importance of mortgage liabilities in the overall asset and liability position of the personal sector, it seems appropriate to examine the general set of housing transactions of which they are a part. Both actual and imputed housing transactions enter the national accounts estimates of the income and outlay of the personal sector. However, since about two-thirds of residential housing is owner-occupied, the imputed transactions are the more significant.

Imputations are used in the national accounts to keep the measurement of production invariant to changes in institutional arrangements in the economy. For the most part, only those goods and services which are exchanged for money in a market are included in the national accounts estimate of production. However, for a limited number of non-market transactions, this rule is relaxed and certain imputations of production are made. The imputed rent on owner-occupied housing, which added $93 million to personal income and $12.3 billion to personal expenditures in 1978, is one of the most important of these imputations, and is intended to make the national accounts estimates of production invariant to shifts that may occur in the mix of owner-occupied and rental accommodation. The imputation, in effect, deems home-owners to be renters of their own accommodation.

To understand how the measured personal savings rate may be affected by personal-sector housing transactions, it is necessary to describe in detail the methodology that is used. As noted, the transactions affect both the expenditure and income sides of the personal-sector accounts. On the expenditure side of the accounts, "gross paid and imputed rents" are included as components of personal expenditures on goods and services. These are computed in the following way. From annual surveys, Statistics Canada estimates the average annual rent paid by tenants of non-farm dwellings. Gross paid rents are then obtained by multiplying the number of tenant-occupied dwellings by the average annual rent. From these gross paid rents, landlord facility expenses, such as amortization of appliances and furniture, fuel, janitor service, electricity and water are subtracted, to arrive at what are termed the gross "space" rents paid by tenants.(1) This figure appears under personal expenditure on services as "gross rent paid". Gross paid space rents thus include the costs of depreciation, repair and maintenance, insurance, mortgage

(1) Landlord facility expenses are subsequently allocated to the various separate expenditure categories to which they relate.

interest costs, municipal taxes, and an element of landlord profit. The average gross imputed space rent is set equal to the average gross paid space rent derived above, after adjustment for differences in the amount of space between owner-occupied and rental accommodations. Gross imputed space rents are then obtained by multiplying the number of owner-occupied dwellings by the average gross imputed space rent.

On the income side of the personal-sector accounts, "net paid and imputed space rents" are included in the item "net income of non-farm unincorporated business including rent". Net paid space rents are simply the incomes earned by individual landlords in the personal sector after deducting their space expenses. Net imputed space rents are defined as gross imputed space rents - the estimate that appears on the expenditure side as outlined above - less the space expenses incurred for owner-occupied housing. These space expenses cover repair and maintenance, municipal property taxes, depreciation, insurance premiums, and mortgage interest. The effect of employing the imputation procedure on the income side of the accounts is essentially to include imputed "owner-landlord" profits on owner-occupied housing as a component of personal disposable income.

Table 6 lists the estimates for gross paid and imputed rents, net paid and imputed rents, and major types of expenses for residential housing included in the national accounts since 1961.

Table 6

Gross Paid and Imputed Rents, Net Paid and Imputed Rents, and Major Types of Expenses for Housing, 1961-1978(1)

(millions of dollars)

| | Gross Paid and Imputed Rents | Net Paid and Imputed Rents | Mortgage Interest | Property Taxes | CCA |
|---|---|---|---|---|---|
| 1961 | 3,279.5 | 835.8 | 575.0 | 871.3 | 468.7 |
| 1962 | 3,505.7 | 839.3 | 667.0 | 958.2 | 482.9 |
| 1963 | 3,775.2 | 905.9 | 741.0 | 969.6 | 510.9 |
| 1964 | 3,966.1 | 835.8 | 837.0 | 1,109.8 | 550.5 |
| 1965 | 4,191.7 | 761.1 | 953.0 | 1,182.4 | 606.2 |
| 1966 | 4,588.1 | 760.9 | 1,154.0 | 1,318.4 | 671.4 |
| 1967 | 5,142.9 | 816.3 | 1,298.7 | 1,516.6 | 732.3 |
| 1968 | 5,744.0 | 1,005.2 | 1,443.1 | 1,664.0 | 764.7 |
| 1969 | 6,389.4 | 1,120.4 | 1,469.4 | 1,790.3 | 842.4 |
| 1970 | 7,221.7 | 1,252.8 | 1,817.4 | 2,009.7 | 917.0 |
| 1971 | 7,828.3 | 1,394.4 | 1,965.1 | 2,026.6 | 1,095.9 |
| 1972 | 8,429.1 | 1,206.8 | 2,191.4 | 2,254.2 | 1,219.4 |
| 1973 | 9,266.4 | 940.9 | 2,640.4 | 2,504.0 | 1,475.8 |
| 1974 | 10,367.9 | 508.9 | 3,159.6 | 2,766.3 | 1,892.9 |
| 1975 | 12,068.1 | 567.9 | 3,751.7 | 3,234.3 | 2,072.9 |
| 1976 | 14,000.1 | 545.6 | 4,534.5 | 3,679.6 | 2,350.8 |
| 1977 | 16,084.7 | 310.4 | 5,574.3 | 4,323.1 | 2,543.7 |
| 1978 | 17,858.5 | 101.9 | 6,559.8 | 4,777.2 | 2,732.1 |

(1) Data refer to non-farm residences, and exclude garages.
Source: Statistics Canada, Gross National Product Division, unpublished data.

The net rent series exhibits a rather unusual behaviour, rising steadily until 1971 and then falling throughout the remaining period. Taking the data at face value, it appears that since gross rents increased throughout the 1961-1978 period, the downturn in net rents was caused by space expenses rising faster than gross rents in the period after 1971. Table 6 shows that all three major types of space expenses increased faster than gross rents over this period, but that mortgage interest payments recorded by far the most rapid increase. During the period 1971-1978, mortgage interest expenses increased at an average annual rate of 18.8 per cent, compared to an average annual growth rate of 12.5 per cent for gross rents. Mortgage interest expenses reacted more quickly, therefore, than paid rents (on which imputed rents are based) to the acceleration of inflation during the 1970s. Increases in the inflation premiums contained in mortgage interest payments, and legal and institutional constraints on market rents such as rent controls and leasing arrangements, both appear to have put downward pressure on net rents after 1971.

With these conventions in mind, it is possible to examine how housing transactions within the personal sector affect the measures of personal income and saving during inflationary periods. Personal saving, it will be recalled, is measured as the difference between the income and outlay of the personal sector. Since gross rents minus space expenses appear on the income side of the accounts, and gross rents appear on the outlay side of the accounts, the only effect on measured saving of housing transactions within the personal sector is through space expenses. Higher space expenses will, other things being equal, lead to lower measured saving. As well as their impact on the savings rate through measured saving, higher space expenses will exert a further impact through measured personal disposable income. This occurs because any downward pressure on net rents resulting from higher space expenses exerts a downward pressure on personal disposable income. Since the savings rate expresses saving as a percentage of personal disposable income, this latter effect places upward pressure on the measured savings rate. Although the two effects exert opposing influences on the savings rate, the direction of the overall effect can be shown to be negative, since equal absolute reductions in measured saving and personal disposable income lead to a reduction in the measured savings rate.(1)

When obtaining an actual estimate of the impact of housing transactions on the measured savings rate, however, it is useful, for purposes of aggregation with earlier estimates, to avoid double-counting the interest premiums contained in mortgage interest expenses. As mentioned previously, higher space expenses have the effect of reducing measured saving. In the case of mortgage interest premiums, however, this effect is already included in earlier estimates presented in Section 3 of the overall effect of interest premiums on measured saving. The estimates presented there were based on the net asset position of the personal sector, and therefore netted increased interest premiums paid on liabilities, including mortgages, against the (larger) increase in interest premiums received on interest-bearing assets. The only effect of mortgage

(1) See Appendix B for an explanation of this result.

interest expense that is incremental to previous estimates, therefore, is its effect in depressing measured personal disposable income. As described above, this will lead to an increase in the measured savings rate.

In order to determine a rough order of magnitude of the contribution of higher rates of inflation, through this effect, to the measured increase in the savings rate since 1971, a new net rent series has been constructed for the period 1971-1978. The constructed series is based on the assumption that, in the absence of the higher expected rate of inflation after 1970, mortgage interest expenses would have maintained the same average share of total housing expenses as in the period 1961-1970. In addition, it is assumed that, in the absence of higher anticipated and unanticipated inflation, the same average relation between gross rents and total space expenses would have prevailed as in the period 1961-1970. The net rent series recorded in the national accounts reflects an increase in the ratio of mortgage interest expenses to total expenses from an average of 0.28 in the period 1961-1970, to an average of 0.34 in the period 1971-1978. At the same time, there was a decrease in the ratio of gross rents to total expenses from an average of 1.24 in the period 1961-1970, to an average of 1.06 in the period 1971-1978. By applying the ratios observed in the period 1961-1970 to actual expenses data for the period since 1970, new series for total expenses, gross rents, and net rents can be successively constructed.

The constructed estimates for net rents are an average of $1.8 billion higher than national accounts estimates over the period 1971-1978. If the constructed rather than the actual estimates were used, personal disposable income would increase, aside from a small adjustment for the taxation of net paid rents, by an equivalent amount. Given these constructed estimates, the average savings rate would have been about 0.2 percentage point lower than was actually observed over the period 1971-1978.

Thus, as a result of their effect in increasing the share of mortgage interest payments in total housing expenses, and narrowing the margin between gross rents and expenses, the higher rates of anticipated and unanticipated inflation are estimated to have caused about a 0.2-percentage-point increase in the average measured savings rate in the period since 1970. Through their effect on the housing transactions of the personal sector, continued high rates of anticipated or unanticipated inflation would thus represent additional sources of resistance to a future reduction in the measured savings rate to more normal historical levels.

## 6. GENERAL TYPES OF BEHAVIOURAL RESPONSE IN PERSONAL SAVING

### 6.1 General

On the basis of the discussion in previous sections, there are several grounds for believing that the increase in the measured personal savings rate during the 1970s is due, in part, to a number of specific linkages to inflation that are translated directly under existing national accounts conventions into an increase in measured saving. Specifically, responses in the interest receipts, pension plan saving and net rents of the personal sector may have contributed slightly more than 2 percentage points to the increase in the average personal savings rate between 1962-1970 and 1971-1979.

Clearly, however, such specific linkages between high rates of inflation and measured saving do not explain all of the increase in the personal savings rate. On average, the savings rate was 3.8 percentage points higher in the period 1971-1979 than in the period 1962-1970. It appears, therefore, that in addition to examining the impact of inflation on personal saving caused by specific responses in capital, labour and housing markets, there is a need to examine more general behavioural factors that may have contributed to the increase in the personal savings rate in recent years.(1)

The explanation and prediction of personal savings behaviour continue to pose formidable theoretical and practical problems. This is perhaps understandable given both the diversity of individuals' savings motives and the range of savings instruments that are available. Notwithstanding these difficulties, certain specific motives have emerged fairly consistently in economic research on the determinants of personal savings behaviour. Three such motives are singled out for discussion here as being particularly relevant to explaining the behaviour of the personal savings rate since 1970: a wealth accumulation motive; a motive to transform present into future consumption; and a motive of risk aversion, in which saving is a reaction to uncertainty, including uncertainty about the future rate of inflation.

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(1) This is not to say that further investigation of specific factors affecting the personal savings rate might not prove useful. It appears, for example, that the methods of financing the provincial medicare programs introduced in the period 1968-1971 may have added between 0.1 and 0.2 percentage points to the average personal savings rate during the 1970s. See The Financing of Medicare and Its Effects on the Personal Savings Rate, Long Range and Structural Analysis Division, Department of Finance, January 1980.

## 6.2 Wealth Effects

The inclusion of wealth as a determinant of saving is a fairly straightforward extension of the well-known relation between saving and current income, to situations in which individuals are assumed to plan their savings decisions over several future periods. This is referred to as the life-cycle hypothesis. In a life-cycle situation, individuals are assumed to accumulate wealth during their working years in order to finance consumption during retirement, the future education of their children, and so forth. Any change in the valuation of accumulated wealth - broadly defined to include the potential earning capacity of the individual as well as real and financial assets - at any given point in the life cycle can be expected to cause a revision in the planned savings profile. For example, individuals who experience a windfall gain in the value of their home equity, or qualify for vested pension benefits can be expected to revise their savings profiles downwards, other things being equal, to compensate for the higher expected value of accumulated wealth. In addition, it can be expected that saving, being geared to longer-term wealth considerations, will be used to cushion the effects on consumption of purely cyclical changes in real income growth. Where the actual real income growth rate exceeds the trend rate of real income growth, the personal savings rate can be expected to record a cyclical increase, and vice versa.

The life-cycle hypothesis also has significant implications for the savings rates of different age groups, and for the effect of changes in the demographic make-up of the population on the aggregate personal savings rate. Expressed in its simplest form, the life-cycle savings hypothesis distinguishes three stages of the life-cycle: dissaving among young adults engaged in education and the early stages of family formation; saving among older working adults; and finally, dissaving among retirees. The aggregate savings rate then varies with the relative importance of the saver and dissaver groups in the population. The life-cycle hypothesis thus suggests that other factors besides the effect of inflation on real wealth should be considered when examining the behaviour of the personal savings rate in recent years.

With respect to evidence concerning wealth effects on saving in recent years, the effect of the erosion of net financial wealth by a partially unanticipated increase in the rate of inflation is fairly unambiguous. This can be assumed to have promoted increased saving, given the substantial net creditor status of the personal sector as a whole, and the disproportionate exposure, on account of lower leverage of their assets, of older age groups for whom life-cycle savings motives are likely to be most powerful. The rapid cyclical upswing in the growth of average real disposable income in the period 1971-1976 may have contributed to the rise in the personal savings rate in those years, but the persistence of high savings rates after 1976, in the face of a negative growth in real disposable income per employed person, indicates that cyclical developments were not likely a decisive factor affecting savings behaviour during the 1970s as a whole.

Certain demographic trends in Canada may have lent some support to the recent increase in personal savings rates, while others could have been expected to put downward pressure on savings rates. The trend towards

increasing female labour force participation,(1) by increasing the capacity of households to save, and a lowering of expected retirement age, which implies a shorter working life over which to accumulate the financial assets needed for a longer retirement, may both have worked in the direction of increasing personal savings rates.(2) On the other hand, the trend towards increasing proportions of the population in the 15-34 age group should have been expected, under life-cycle assumptions, to put downward pressure on savings rates, as these young adults engaged in education and the early stages of family formation. Even here there is some ambiguity, however, since traditional patterns of dissaving may have been changing over this period. Falling fertility rates, lower rates of enrolment in higher education and increased fiscal incentives to saving(3), may have caused traditional dissaver groups to save more in recent years.

In the case of the changing age composition of the Canadian population, Table 7 shows that there was only a slight increase between 1971 and 1976 in the proportion of the population aged 35-64 years for whom life-cycle savings motives should have been most powerful. The most significant shift that occurred during this period was the increased proportion of the population aged 15-34 years. This mainly reflected the passage of large segments of the 1945-1960 baby boom group into the 15-34 age range. This expanding age group presumably included some individuals commencing their life-cycle saving, but the impact on the aggregate savings rate can be assumed to have been restricted by the relatively low concentration of disposable income in this age range. Census statistics indicate, for example, that while individuals in the 15-34 age group accounted for about 46 per cent of the total working-age population in 1970, they only accounted for about 35 per cent of total earned income in that year. The limited leverage on the aggregate savings rate of those individuals in the 15-34 age range who were saving must have been offset to some extent also by the slightly greater proportion of elderly (dissaver) individuals in the population in 1976 compared to 1970.(4)

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(1) See Participation Rate and Labour Force Growth in Canada, Department of Finance, April 1980.

(2) In the case of the retirement age factor, the individuals who retire earlier are likely to be a source of additional dissaving. However, given the predominance of younger age groups in the population, this can be expected to be more than offset by the increased saving of individuals who anticipate an earlier retirement, but who are not yet retired.

(3) See Section 6.3 below.

(4) The conclusion reached here about the very limited effects of recent demographic changes on the aggregate personal savings rate is consistent with the historical analysis of F.T. Denton and B.G. Spencer in "Household and Population Effects on Aggregate Consumption", Working Paper 74-08, Department of Economics, McMaster University. Basing their analysis on data for the period 1928-1971, the authors find no significant effects of either age composition or household formation patterns on aggregate consumption.

Table 7

Percentage Distribution of Total Population for Canada, by Age Group, Selected Years

| | 1970 | 1976 | 1986 | 1996 |
|---|---|---|---|---|
| 0-14 | 29.58 | 25.64 | 21.97 | 20.70 |
| 15-34 | 31.96 | 35.23 | 34.78 | 29.62 |
| 35-64 | 30.37 | 30.42 | 33.03 | 37.94 |
| 65+ | 8.09 | 8.71 | 10.22 | 11.74 |
| Total | 100.00 | 100.00 | 100.00 | 100.00 |

Source: Statistics Canada, 1971 Census of Canada, Population, Cat. 92-715, Vol. 1, part 2; and the Department of Finance.

The overall impact of these demographic changes on the aggregate personal savings rate remains uncertain. However, since the effects should be expected to work very slowly, they do not appear to represent a primary factor in the rapid increase in the savings rate in the first half of the 1970s. At the same time, the population projection presented in Table 7 indicates that no significant downward pressure on the aggregate personal savings rate should be expected from demographic factors over the medium and long term. Beginning in 1980, members of the 1945-1960 baby boom group will enter what has traditionally been the high-saving 35-64 age group for the first time. New baby boom entrants will then continue to swell the ranks of the 35-64 age group through to 1995.(1)

Increasing attention has been focussed in recent years on the effect of public pension and old age security arrangements on rates of personal saving. If expected future pension and old age security benefits are regarded as a form of personal wealth, then it is argued that the existence of such arrangements will cause a reduction in saving, along the lines of the life-cycle hypothesis already described.(2) Various empirical studies using U.S. data have claimed a fairly sizeable effect of social security wealth on aggregate personal saving,(3) but the

(1) Samur, Jarvis and McCracken, op. cit., Appendix I, pp. 9-11, make this same argument in terms of expected future declines in the dependency ratio, measured as the fraction of "non-working" individuals in the total labour force. As well as simply taking into account the aging of the population, their approach also captures the likely effect of increasing female participation rates on personal savings behaviour.
(2) See Martin Feldstein, "Social Security and Saving: The extended life cycle hypothesis", American Economic Review, Vol. 66, no. 2, May 1976.
(3) See Martin Feldstein, "Social security, induced retirement and aggregate capital accumulation", Journal of Political Economy, no. 5, Sept/Oct 1974, and Alicia Munnell, "The effect of social security on personal savings", Ballinger Cambridge, 1974.

validity of such findings continues to be subject to serious question.(1) No similar effect has yet been found in Canada.(2) The indexing of Old Age Security and Canada/Quebec Pension Plan benefits that came into effect in 1974 presumably increased the perceived value of social security wealth, at least if the possibility of resulting increases in future contribution rates is ignored. However, the absence of substantial modifications in public pension coverage since 1970, and the slow-moving nature of the demographic factors underlying social security wealth estimation,(3) indicate that changes in social security wealth were probably not a major factor determining the personal savings profile in the period since 1970.

Other recent forces can be identified as possibly contributing to wealth effects on personal saving, but their overall impact remains uncertain. Mention has been made of the rapid accumulation of private pension wealth by the personal sector in recent years, and the value of home equity has also increased rapidly during this period. What remains uncertain, however, is the extent to which this apparent accumulation of wealth represents, in whole or in part, a redistribution of wealth among individuals in the sector, and/or a substitution of one form of wealth for another. Two examples illustrate these possible effects. First, to the extent that renters react to increased housing prices by saving more, to allow for the eventual purchase of a home, an increase in the equity of home-owners may simply be offset by what is perceived by renters as an effective erosion of their real wealth.(4) Second, an enrichment of private pension benefits stemming, perhaps, from more stringent vesting requirements, may simply reduce the equity value of the companies that finance the benefits. Since much of this equity is held by the personal sector, the overall effect on personal wealth is uncertain.

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(1) See Louis Esposito, "Effect of Social Security on Saving: Review of Studies Using U.S. Time Series Data", Social Security Bulletin, May 1978.

(2) See Phelim Boyle and John Murray, "Social security wealth and private saving in Canada", Canadian Journal of Economics, Vol. XII, no. 3, August 1979. The authors find no significant effect of either OAS or C/QPP wealth on personal saving. In the case of the C/QPP arrangements, which were first introduced in 1966, the reliability of the results may be undermined by the concurrent effects, described earlier, of high rates of inflation on measured savings data.

(3) In general, the per capita amount of social security wealth, measured as the present value of future benefits minus future contributions, where applicable, depends on the size of the working-age and retired populations and their respective age distributions.

(4) The Economic Council of Canada Review, op. cit., p. 22 identifies the accumulation of large downpayments for home purchases as one source of increased personal saving during the 1970s, without addressing possible offsetting wealth effects from increases in home equity. The link described in the Review between saving and home-ownership patterns may simply act as a proxy for broader demographic effects on savings behaviour, such as the increased saving capacity of multiple-earner households.

To summarize, a number of wealth-related factors have been discussed that may have influenced the profile of personal savings rates since 1970. Among these were the effect of an unanticipated increase in the rate of inflation on personal-sector financial wealth, various trends in the age distribution and labour market behaviour of the population, and various developments in the public and private pension field. Some of these factors were argued to be uncertain in their effect, and others not to have been very significant in recent years, but it remains a general presumption that wealth effects, and particularly the erosion of real financial assets by a partially unanticipated increase in the rate of inflation, served overall to promote a higher personal savings rate in the period since 1970.

## 6.3 Rate-of-Return Effects

In addition to the life-cycle type of saving described above, it is also usual to assume that individuals switch between present and future consumption, to take advantage of fluctuations in the expected real rate of return on saving.(1) Essentially, the argument is that the higher the expected return, the higher is the expected cost of present as compared to future consumption, and the greater is the incentive to postpone consumption and therefore save more.(2)

In reality, there is no single expected rate of return on saving, but rather a series of expected rates of return on different savings instruments, such as corporate bonds, mortgages, equity and deposits. The use of a single rate of return is normally characterized as representing a proxy or composite of the range of yields on a set of savings instruments of different maturity and risk classes. While this is a convenient approach, it tends, however, to mask important shifts that can take place in the portfolio composition of saving. It is worthwhile reviewing, therefore, how the rates of return on different financial assets are likely to behave in an inflationary environment, and how, in turn, they might affect the level and composition of personal saving. As will become clear in the discussion that follows, it is critical to consider the effects on rates of return of the personal and corporate tax structures, particularly in an inflationary environment, in order to discern the real behavioural effects on saving.

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(1) The real rate of return that is expected and the rate of return that is ultimately realized will generally differ, but it is the expected return that is relevant to savings decisions. Expected returns are not directly observable, but must be inferred from market data, given assumptions about the formation of expectations.

(2) In theory, the direction of the rate-of-return effect is indeterminate. An increase in the rate of return will have both a substitution effect toward future consumption, and an income effect favouring present consumption, future consumption, or both. Both the magnitude and the direction of the rate-of-return effect must, therefore, be determined empirically. While recent econometric evidence has done little to reduce uncertainty about the interest elasticity of saving, there remains a presumption that the elasticity is positive. See Michael J. Boskin, "Taxation, Saving and the Rate of Interest", Journal of Political Economy, Vol. 86, no. 2, April 1978.

In the case of debt instruments, the premiums built into interest payments as a result of anticipated inflation are frequently taxed in the hands of the individual, even though they are intended to compensate for an anticipated decline in the real value of assets. On the other hand, all interest payments on corporate debt can be deducted by firms as a business expense, despite the fact that any inflation premiums contained in these payments represent an offset to the anticipated decline in the real value of the firm's liabilities. Thus, in the presence of anticipated inflation, interest costs are effectively subsidized at the level of the firm in the amount of the corporate tax on the reduction in real liabilities that is thereby avoided.

In general, where lenders and borrowers face different marginal tax rates, the existence of anticipated inflation can be shown to affect both the expected real after-tax rate of return to the lender and the amount of lending undertaken.(1) A simplified example illustrates this point. Consider a situation where firms use only debt financing, and the corporate tax system is neutral with respect to inflation in all respects except the provision for deductibility of interest premiums. Thus, corporate taxable income is computed net of replacement cost depreciation and inventory profits. In this simplified situation, an increase in the anticipated rate of inflation can be shown to increase the real after-tax return to the lender where the borrower's marginal tax rate exceeds that of the lender. In effect, the interest subsidy to the firm arising from the deductibility of interest premiums outweighs the effect of the taxation of interest premiums in the hands of the individual lender. Overall, there is a net subsidy to debt financing that will be divided between the firm and its debt holders in the form, respectively, of lower real after-tax costs of borrowing and higher real after-tax rates of return. However, in the more realistic situation where both debt and equity are used as sources of finance, and the corporate tax system is not neutral with respect to inflation,(2) the direction of the effect on real returns cannot be determined *a priori*, even where the relative marginal tax rates of lenders and borrowers are known. Intuitively, any negative effect of inflation on the real after-tax profitability of the firm, resulting from a non-neutral corporate tax system, will be borne by both debt and equity holders, and any negative effect on the return to debt resulting from this could, in principle, outweigh the favourable interest subsidy effect already discussed.(3)

In the case of equity, the expected real return is subject to a variety of effects from the interplay of inflation and the tax structure. This interplay will occur whether inflation is anticipated or unanticipated.

(1) See J.F. Chant and D.G. McFetridge, The Allocative Effects of Inflation: Interaction Between the Tax System and Anticipated Inflation Rates, Anti-Inflation Board, 1979, pp. 29-34, and Martin Feldstein, "Inflation, Income Taxes, and the Rate of Interest: A Theoretical Analysis", American Economic Review, Vol. 66, no. 5, December 1976.
(2) See following two paragraphs for a discussion of various sources of non-neutrality of the corporate tax system with respect to inflation.
(3) See Martin Feldstein, Jerry Green, and Eytan Sheshinski, "Inflation and Taxes in a Growing Economy with Debt and Equity Finance", Journal of Political Economy, Vol. 86, no. 2, April 1978.

First, since the value of capital cost allowances is fixed in nominal terms under existing tax law, the real value of these allowances as an offset against taxable income is reduced by inflation. Second, current inventory valuation methods imply that with a change in prices, there is a change in the value of goods removed from stock between the time they enter and the time they leave the inventory. This shows up as current trading profit in the computation of income subject to tax, with no allowance for the need to replenish inventories at the higher level of prices.(1) Third, the cash and other liquid assets held by firms to carry out their operations will fall in real value in an inflationary environment, but this loss in real value is not treated under current accounting conventions as a cost of doing business. These three effects tend to reduce the surplus that a firm can potentially distribute to its shareholders.(2)

On the other hand, in the presence of unanticipated inflation , leveraged firms will experience an unanticipated reduction in their real liabilities, and this will tend to increase the potential distributable surplus. In addition, any reduction in the real cost of debt capital to the firm resulting from the interest-subsidy effect of anticipated inflation described previously, will increase the present value of the firm's future earnings stream. These two effects tend to increase the surplus that a firm can potentially distribute to its shareholders.

The overall effect of inflation on the expected return to equity at the level of the firm is thus uncertain in principle, and an empirical estimate of the effect necessitates a fairly complex series of adjustments to corporate balance sheets.(3) The uncertainty is compounded by the fact that the linkage between the potential distributable surplus at the level of the firm and the expected returns at the level of the individual investor, in the form of dividends or capital gains, is not well understood. It is not at all clear that investors look only or even mainly at inflation-corrected earnings when assessing their expected return on equity.(4)

The impact on saving of high rates of inflation, through rate-of-return effects, is thus less clear-cut than in the case of the wealth effects previously discussed. The evidence from Canadian and U.S. data seems, however, to support the general presumption that they must have had a

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(1) The discussion ignores specific changes in corporate tax provisions introduced, in part, to provide some amount of offset to these possible effects of inflation on corporate after-tax profitability. Examples of such changes are: the replacement in 1972 of the declining balance method of depreciation by two-year straight-line depreciation in the case of new investments in machinery and equipment; and the deduction from corporate income of 3 per cent of the opening value of inventories allowed since 1977.

(2) See Rates of Return and Investment Profitability, Department of Finance, April 1980, for a more detailed discussion of these various effects.

(3) Ibid.

(4) See Franco Modigliani and Richard A. Cohn, "Inflation, Rational Valuation and the Market", Financial Analysts Journal, March/April 1979.

discouraging effect on personal saving in recent years through a reduction in real rates of return.(1) Table 8 presents, for Canada, a set of indicators of the expected real rates of return on a number of financial assets for the period 1963-1978. While they are no more than crude indicators of relative movements in expected returns, the data in the table are indicative of the declining trend in expected real returns during inflationary periods that has been reported elsewhere.(2) The decline in real rates of return on these various financial assets is likely to have exerted a negative force on personal saving in the period since 1970.

In the case of equity, the indicator presented for the expected real return is a moving average of the dividend yield on common stocks in the Toronto Stock Exchange 300 composite, plus the capital gain on the composite, net of inflation. The indicator is constructed on the assumption that past dividend yields and capital gains will affect expectations about the magnitude of future dividend yields and capital gains. As shown in column 1 of the table, the indicator of the expected return on equity fell, on average, by about 8 percentage points in the period 1971-1978, compared to the average expected return in the period 1963-1970. While this is no more than an indicator of the direction of change in equity returns, and while the two periods chosen are not strictly comparable in cyclical terms, the measures presented are nonetheless suggestive of a negative impact of inflation on the expected return to equity in the period since 1970.(3)

With respect to rates of return on debt instruments, the data in Table 8 suggest that the expected real yields on both short-term and long-term instruments also declined during the 1970s. Since expected rather than actual yields determine the attractiveness of debt instruments in individuals' portfolios, it is preferable, when choosing an indicator of real yields, to subtract from nominal yields a series of expected rather than actual inflation rates. The expected inflation series is calculated as a weighted or moving average of past inflation rates. The second and third columns of Table 8 show such profiles for the expected real yield on short-term and long-term instruments, respectively,

(1) A good summary of Canadian and U.S. evidence is presented in James E. Pesando, The Impact of Inflation on Financial Markets in Canada, C.D. Howe Research Institute, 1977, pp. 20-44. Feldstein, Green and Sheshinski, op. cit., also find a strong negative relation between inflation and the real returns on debt and equity in their more theoretical treatment of U.S. data.

(2) Pesando, ibid.

(3) The movement of the expected return on equity mainly reflects the failure of stock values to keep up with inflation in the period since 1973, so that the large real capital gains experienced in the mid-1960s were no longer in evidence. As suggested by Modigliani and Cohn, op. cit., in the case of the U.S., the relatively poor performance of Canadian common stocks in this period may have been the result of a failure by investors to take into account the understatement in reported corporate earnings caused by inflation-induced declines in the real value of corporate indebtedness. This argument is pursued in Rates of Return and Investment Profitability, op. cit.

Table 8

Indicators of Expected Real Rates of Return on Various Financial Assets, 1963-1978 (per cent)(1)

| | Real Return on Equity(2) | Real Return on Short-Term Instruments(3) | Real Return on Long-Term Instruments(4) | Real Return on Deposits(5) |
|---|---|---|---|---|
| 1963 | 8.6 | 2.3 | 4.2 | n/a |
| 1964 | 8.9 | 2.1 | 3.9 | n/a |
| 1965 | 12.9 | 2.2 | 3.8 | 2.3 |
| 1966 | 6.6 | 3.2 | 4.1 | 2.7 |
| 1967 | 8.1 | 2.2 | 3.8 | 2.0 |
| 1968 | 6.9 | 2.6 | 4.2 | 2.8 |
| 1969 | 4.9 | 3.2 | 4.8 | 3.2 |
| 1970 | 0.4 | 1.7 | 4.9 | 2.7 |
| 1971 | 2.7 | 0.2 | 4.9 | 1.4 |
| 1972 | 4.0 | 0.2 | 4.9 | 1.9 |
| 1973 | 3.7 | 1.0 | 4.0 | 2.4 |
| 1974 | -2.4 | 1.3 | 3.1 | 2.3 |
| 1975 | -0.6 | -2.3 | 1.1 | -1.8 |
| 1976 | -2.5 | -1.4 | 0.2 | -1.0 |
| 1977 | -6.3 | -1.3 | 1.1 | -1.2 |
| 1978 | -5.7 | -0.4 | 1.0 | -0.5 |
| Averages | | | | |
| 1963-70 | 7.2 | 2.4 | 4.2 | 2.0(6) |
| 1971-78 | -0.9 | -0.3 | 2.5 | 0.4 |

(1) Indicators of expected rates of return are prior to taxation in the hands of the individual.
(2) Measured as a five-year moving average of the dividend yield on the Toronto Stock Exchange (TSE) 300 composite plus the percentage change in the value of the composite index, net of the change in the consumer price index. The composite index and dividend yield are reported in the T.S.E. 300 Stock Price Indexes Manual.
(3) Nominal returns are measured by the average annual yield on three-month treasury bills, as reported in the Bank of Canada Review and the Bank of Canada Statistical Summary. Real returns are measured as nominal returns minus the average of a three-month expected inflation rate for each quarter of the year.
(4) Nominal returns are measured by the McLeod, Young, Weir 10 industrials bond yield average. Real returns are measured as nominal returns minus an expected annual inflation rate.
(5) Nominal returns are measured by the average interest rate on chartered bank 90-day deposit receipts, as reported in the Bank of Canada Review and the Bank of Canada Statistical Summary. Real returns are measured as nominal returns minus the average of a three-month expected inflation rate for each quarter of the year.
(6) Average 1965-1970.
Source: Long Range and Structural Analysis Division, Department of Finance.

where expected inflation rates are generated as a geometric distributed lag of actual inflation rates in the preceding 12 quarters. Both profiles show a fairly marked decline after 1970. The fourth column in Table 8 shows the profile of a comparable indicator of the expected real return on deposits. Again, there is evidence of a steady downward trend in this indicator after 1970. The taxation of interest premiums, discussed previously, can be assumed to have placed an additional downward pressure on real after-tax rates of interest earned by individuals on each of these instruments over this period.

There were a number of important changes in the personal tax system during the 1970s which may have attenuated the impact of the downward trends described on the after-tax returns on certain forms of saving. One example is the $1,000 Canadian-source interest and dividend deduction introduced in 1974. Another aspect of the tax system that is of particular interest in terms of its effect on the after-tax rate of return on saving is the treatment of qualified contributions to registered retirement savings plans (RRSPs). The use of the RRSP as a savings vehicle has been considerably popularized during the 1970s, a trend that was supported by the qualification of spousal plans in 1974 and the raising of the dollar limits for deductibility in 1976.

Some of the growth in RRSP saving undoubtedly occurred at the expense of other types of savings instruments.(1) In addition to this switch into RRSP instruments, however, there are indications that, for a large number of taxpayers, the impact of RRSP provisions on the after-tax returns to saving may have been of a sufficient size to bring about an increase in their total saving.(2)(3) A similar argument applies in

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(1) There is a tendency in popular discussion of the effect of RRSPs to consider the total contributions to such plans as representing entirely incremental saving; see, for example, the C.D. Howe Research Institute, Policy Review and Outlook, 1979: Anticipating the Unexpected, a staff report, 1979, p. 104. Neither the size of the residual increase in the savings rate after the specific linkages of inflation to the savings rate examined previously have been taken into account, nor the empirical evidence concerning the incremental impact of pension on other forms of saving, appear to support this view. On this latter point, see Martin Feldstein, "Do Private Pensions Increase National Savings?", Journal of Public Economics, Vol. 10, December 1978.

(2) See Lawrence I. Gould and Stanley N. Laiken, "The Effect of Income Taxation on Investment: The RRSP", Canadian Tax Journal, Vol. XXV, No. 6, 1977. The impact on after-tax return depends in a complex way on the range of tax shelters available, the tax situation of the individual investor, his age at entry into the RRSP, and the holding period. Averaged over a number of "representative" individuals, Gould and Laiken estimate an after-tax rate on return for the RRSP that is 60 per cent greater than for a non-sheltered investment.

(3) Samur, Jarvis and McCracken, op. cit., p. 21, argue that in addition to the effect of RRSPs on the after-tax return on saving, these plans also tend to lock in subsequent earnings on the amounts invested. In the absence of adjustments in other types of saving, these earnings show up as an increase in personal saving. The argument is one aspect of the authors' more general thesis of non-substitutability between contractual forms (including RRSPs) and discretionary forms of saving.

the case of contributions to registered home ownership savings plans (RHOSPs). The eleven-fold increase in RRSP contributions shown in Table 9 during the period 1970-1977 provides evidence of sorts that, for some individuals, the rate-of-return effect may also have provided a stimulus to additional saving over this period.

Table 9

Contributions to Registered Retirement Savings Plans, 1968-1977
(millions of dollars)

| | |
|---|---|
| 1968 | 142.6 |
| 1969 | 178.6 |
| 1970 | 225.2 |
| 1971 | 319.8 |
| 1972 | 645.1 |
| 1973 | 922.6 |
| 1974 | 1,243.7 |
| 1975 | 1,524.3 |
| 1976 | 2,115.5 |
| 1977 | 2,368.9 |

Source: Revenue Canada, Taxation, Taxation Statistics.

The changes, shown in Table 10, in the distribution of the financial assets of the personal sector since 1970, are broadly consistent with the shifts, shown in Table 8, in relative real rates of return. The relative importance of stocks in the portfolio of the personal sector is seen in the first column of the table to have registered a fairly steady decline during the 1970s, while the relative importance of deposits is seen in the fourth column to have registered a substantial increase. During this same period, it will be recalled that there was a substantial narrowing, and then a reversal, of the expected real return spread between equity and deposits.

The switch into RRSP and RHOSP savings instruments caused by the increased tax advantages offered by such forms of saving is also confirmed by the marked increase in the relative importance of deposits (which include a large proportion of RRSP and RHOSP saving) over this same period.

The data in the second and third columns of the table show a significant shift away from long-term instruments, but no apparent shift away from short-term instruments in personal-sector portfolios. This occurred despite the fact that the expected real return spread between long-term instruments and deposits remained fairly constant between the two periods, while the expected spread between the returns on short-term instruments and deposits moved somewhat in favour of deposit instruments. Two reasons may explain this behaviour. First, uncertainty factors associated with differences in the variability of yields may have contributed to raising the relative risk-adjusted return on short-term instruments, and lowering the relative risk-adjusted return on long-term instruments. This issue is discussed in more detail in the following section. Second, with a movement by the personal sector away from stocks and long-term debt in its portfolio, a wealth-induced

increase in saving would need to be channeled into some savings vehicle, and short-term instruments represented one of the limited range of such vehicles available.

Table 10

Distribution of Financial Assets of Personal Sector, 1961-1978 (per cent)

| | | Market Instruments(1) | | | |
|---|---|---|---|---|---|
| | Stocks(2) | Long Term | Short Term(3) | Deposits | Other(4) |
| 1961 | 24.5 | 17.2 | 7.1 | 26.2 | 25.0 |
| 1962 | 23.9 | 18.1 | 7.5 | 25.8 | 24.7 |
| 1963 | 23.7 | 17.0 | 7.6 | 26.3 | 25.4 |
| 1964 | 23.9 | 15.8 | 7.8 | 27.3 | 25.2 |
| 1965 | 23.9 | 15.3 | 7.3 | 28.3 | 25.2 |
| 1966 | 24.1 | 15.0 | 7.0 | 28.7 | 25.2 |
| 1967 | 23.1 | 15.0 | 6.6 | 30.1 | 25.2 |
| 1968 | 22.8 | 13.6 | 6.6 | 31.3 | 25.7 |
| 1969 | 22.4 | 13.2 | 6.6 | 31.8 | 26.0 |
| 1970 | 21.7 | 13.4 | 6.3 | 32.7 | 25.9 |
| 1971 | 20.7 | 12.0 | 7.4 | 33.4 | 26.5 |
| 1972 | 19.6 | 11.6 | 7.3 | 33.7 | 27.8 |
| 1973 | 18.8 | 11.2 | 6.3 | 36.2 | 27.5 |
| 1974 | 19.2 | 10.6 | 7.1 | 36.6 | 26.5 |
| 1975 | 19.0 | 9.4 | 7.2 | 37.4 | 27.0 |
| 1976 | 18.4 | 8.3 | 6.6 | 38.8 | 27.9 |
| 1977 | 19.9 | 9.9 | 6.1 | 37.5 | 26.6 |
| 1978 | 19.3 | 9.1 | 6.3 | 37.9 | 27.3 |
| Averages | | | | | |
| 1961-70 | 23.4 | 15.4 | 7.0 | 28.8 | 25.3 |
| 1971-78 | 19.4 | 10.3 | 6.8 | 36.4 | 27.1 |

(1) Book values.
(2) Because of valuation difficulties, stock values are measured as the net worth of companies.
(3) Consumer credit receivables, treasury bills, short-term paper and savings bonds.
(4) This category includes trusteed and insured pension plan assets.
Source: Financial Flow Accounts, Volume II, Cat. 13-563 (1961-1976) and Financial Flow Accounts, Cat. 13-002, Fourth Quarter, 1978 (1977-1978).

To summarize, real rates of return were subject to several opposing influences in the period after 1970, some resulting from inflation and others from changes in the tax system. As a result of these various influences, the evidence suggests that there was a general decline in expected before-tax real returns after 1970, and some shift in the relative before- and after-tax rates of return expected on different financial assets. There is a presumption that the general decline in

real returns exerted a negative force on personal saving, and that the shift in relative returns favoured the placing of a greater proportion of personal-sector financial assets into deposit instruments.

## 6.4 Uncertainty Effects

The third motive for saving that should be mentioned is its use as a response to uncertainty, and particularly uncertainty about future levels of unemployment and the rate of inflation. Uncertainty effects are particulary difficult to isolate and quantify, and this section therefore confines itself to presenting qualitative evidence about the presence of such effects.

In the case of unemployment, individuals who foresee a greater likelihood of experiencing some unemployment, or an increase in the average duration of a spell of unemployment, should be expected to revise their savings profiles upwards to cushion the effect of the expected future decline in earnings.(1) This is consistent with the life-cycle savings hypothesis discussed earlier in Section 6.2.

Uncertainty about inflation is a factor which is identified consistently by consumers as affecting their confidence and buying intentions. The linkages between saving and uncertainty about inflation have also been the subject of a good deal of theoretical discussion. Two main lines of argument have been pursued. First, it has been argued that an increased variance in expected real income, stemming from a greater variability of inflation when inflation is at high rates, is associated with an increased probability of unplanned additions to and withdrawals from saving. Individuals, averse to unplanned withdrawals from saving, react to the increased variance of real income by saving more.(2) Second, it has been argued that the greater volatility in relative prices associated with higher rates of absolute price change makes it more difficult to distinguish absolute from relative price movements, and individuals postpone purchases (increase saving) until a search of the market confirms the prevailing set of prices.(3) This search-related factor appears particularly relevant to the case of "lumpy" purchases of durables, such as automobiles and appliances, where the consumer enters the market at discrete and often irregular intervals.

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(1) This reaction of the larger group of individuals who are currently employed to the prospect of future unemployment should be distinguished from the reaction of the smaller group of individuals who are currently experiencing unemployment. This latter group can be expected to record a decreased savings rate as it attempts to maintain its consumption expenditures with a reduced level of income.

(2) See Thomas F. Juster, "A Note on Inflation and the Savings Rate", Brookings Paper on Economic Activity, no. 3, 1973. The existence of risk aversion on the part of individual investors is broadly supported in empirical tests of modern portfolio theory. See Michael C. Jensen, "Capital Markets: Theory and Evidence", Bell Journal of Economics and Management Science, Vol. 3, no. 2, 1972.

(3) See Angus Deaton, "Involuntary Saving through Unanticipated Inflation", American Economic Review, Vol. 67, December 1977.

With respect to evidence concerning uncertainty effects, the rising trend in the aggregate unemployment rate after 1970 can be assumed to have affected expectations about the incidence of unemployment, and thus to have placed upward pressure on savings rates.(1) The average duration of spells of unemployment also appears to have increased over at least part of this period,(2) which would again tend to have promoted greater personal saving as a response to increased uncertainty.

In the case of the uncertainty effects of inflation, it appears that higher rates of inflation have generally been associated over the period since 1950 with higher variability in both absolute and relative price changes.(3) The variability of changes in real personal disposable income per capita has also tended to increase with higher rates of inflation, but the correlation is much weaker than in the case of absolute price changes. This relative insulation of real disposable income from the effect of variability in the rate of inflation can presumably be ascribed, in part, to various institutional changes introduced in the recent inflationary environment. Examples of such changes were the indexation of the personal tax system, the indexation of a wide range of transfer payments, the introduction of cost-of-living-adjustment clauses into labour contracts, and the trend toward a shortening of the period of labour contracts. Overall, however, it is reasonable to assume that both the search-related and, to a lesser extent, the risk-averse reactions to the greater variability of high rates of inflation must have been at work in pushing up the savings rate during the 1970s.

The flow-of-funds data presented in Table 11 on the composition of the increased saving that has taken place since 1970 are also consistent with the view that uncertainty was an important factor affecting savings behaviour during this period. As can be seen in the table, there was, after 1970, a move by the personal sector to more rapid acquisition of tangible assets and financial liabilities, with the move into tangible assets after 1974 being particularly marked. This move into tangible assets and financial liabilities can be explained in terms of the motive, discussed earlier, of maintaining the real value of personal-sector net wealth. Tangible assets in the form, for example, of real estate or fixed capital can be assumed to maintain their real value in an inflationary environment, while the real value of financial liabilities will be eroded by any unanticipated inflation that occurs.

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(1) This effect on savings behaviour of uncertainty about the incidence of unemployment is not unique to the period after 1970. Relative to cyclically-adjusted levels, unemployment rates in the late 1950s and early 1960s were as high as in the mid-1970s. The fact that the savings rate declined slightly from 1956 to 1964 presumably reflects the more powerful offsetting effects of factors such as the moderating inflation experience during this period.

(2) See N. McIlveen and H. Sims, The Flow Components of Unemployment in Canada, Statistics Canada Special Labour Force Study, Cat. 71-511, July 1978.

(3) See Dennis E. Logue and Thomas D. Willett, "A Note on the Relation between the Rate and Variability of Inflation", Economica, 43, May 1976, and Canada's recent inflation experience, Department of Finance, November 1978, pp. 27-30.

Table 11

Forms of Personal Saving as Percentage of Disposable Income, 1962-1978

| | Net Saving | | | | | | |
|---|---|---|---|---|---|---|---|
| | Total | | In the Form of | | | | |
| | National Accounts Basis (B + G) | Financial Flows Basis (C + D) | Tangible Assets(1) | Financial Assets and Liabilities (E + F) | Financial Assets(2) | Financial Liabilities(3) | Discrepancy(4) |
| | (A) | (B) | (C) | (D) | (E) | (F) | (G) |
| 1962 | 5.6 | 7.0 | 3.1 | 3.9 | 14.0 | -10.1 | -1.4 |
| 1963 | 5.4 | 7.5 | 3.0 | 4.4 | 10.0 | - 5.5 | -2.1 |
| 1964 | 4.2 | 4.8 | 2.1 | 2.8 | 12.8 | -10.0 | -0.6 |
| 1965 | 5.5 | 6.8 | 2.3 | 4.4 | 13.3 | - 8.8 | -1.3 |
| 1966 | 6.7 | 8.6 | 2.5 | 6.1 | 11.5 | - 5.4 | -1.9 |
| 1967 | 6.3 | 8.1 | 1.6 | 6.6 | 17.0 | -10.5 | -1.8 |
| 1968 | 5.6 | 6.4 | 1.9 | 4.4 | 11.8 | - 7.3 | -0.8 |
| 1969 | 5.4 | 4.1 | 2.2 | 1.9 | 9.2 | - 7.3 | 1.3 |
| 1970 | 5.3 | 6.6 | -0.2 | 6.9 | 13.2 | - 6.3 | -1.3 |
| 1971 | 5.9 | 8.0 | 0.9 | 7.1 | 16.9 | - 9.7 | -2.1 |
| 1972 | 7.4 | 6.1 | 0.9 | 5.3 | 17.4 | -12.1 | 0.7 |
| 1973 | 9.0 | 7.8 | 1.8 | 6.0 | 22.9 | -16.9 | 1.2 |
| 1974 | 9.9 | 9.0 | 1.5 | 7.4 | 21.5 | -14.0 | 0.9 |
| 1975 | 10.9 | 10.4 | 2.4 | 7.9 | 21.9 | -14.0 | 0.5 |
| 1976 | 10.2 | 8.9 | 3.8 | 5.1 | 21.2 | -16.1 | 1.3 |
| 1977 | 10.0 | 8.0 | 2.8 | 5.2 | 21.0 | -15.8 | 2.0 |
| 1978 | 10.4 | 9.6 | 2.7 | 6.9 | 22.5 | -15.7 | 0.8 |
| Averages | | | | | | | |
| 1962-70 | 5.5 | 6.6 | 2.0 | 4.6 | 12.5 | -7.9 | -1.1 |
| 1971-78 | 9.2 | 8.5 | 2.1 | 6.4 | 20.7 | -14.3 | 0.7 |

(1) Tangible assets are defined as non-financial capital acquisition less capital consumption allowances and miscellaneous valuation adjustments. Tangible assets include housing, non-residential construction, machinery and equipment, farm inventories, and inventories of other unincorporated businesses.
(2) Financial assets include equity, short-term and long-term market instruments, currency and deposits, and pension fund assets.
(3) Financial liabilities include consumer credit payables, bank and other loans, and mortgages.
(4) The discrepancy listed here differs from the discrepancy recorded in the financial flow accounts, due to rounding error and recent revisions in national accounts estimates.
Source: Personal saving (NIEA basis) and personal disposable income from Statistics Canada, National Income and Expenditure Accounts, Cat. 13-201; flow-of-funds data from Financial Flow Accounts, Volume II, Cat. 13-563 (1962-1974) and Financial Flow Accounts, Cat. 13-002, Fourth Quarter, 1978 (1975-1978).

On the other hand, there was an equally rapid acquisition of financial assets after 1970, assets which were directly exposed to erosion by unanticipated inflation. The move into financial assets is all the more striking when the data are considered in terms of longer-term averages. Of the 1.9-percentage-point increase in the average personal savings rate observed in the flow-of-funds data in the period 1971-1978, compared to the period 1962-1970, 1.8 percentage points of the increase stems from increased saving in net financial assets.(1) What appears at first as a paradoxical development in the composition of the increased saving that occurred can be explained, in part, as an attempt by the personal sector to save more in the form of more liquid financial assets for precautionary purposes.(2)

In addition to the effect of uncertainty on the level of saving, it has also been argued that uncertainty will cause shifts in the portfolio composition of personal-sector financial assets. In particular, it has been argued that if the variability of the returns on a particular asset increases around a constant mean, there will be a tendency for the proportion of this asset included in individuals' portfolios to decline.(3)

In terms of the composition of the financial assets of the personal sector, the data in Table 10 indicated the shift that has taken place from equity and long-term instruments to deposits in individuals' portfolios in the period since 1970. The data also showed that holdings of short-term instruments remained fairly stable during this period. While some part of the portfolio shift can be attributed to the rate-of-return effects already described, the shift that occurred is broadly consistent with a move to more liquid and less volatile assets in the face of uncertainty about the future course of inflation. Deposits and short-term instruments are attractive under such circumstances since they protect against large negative changes in the real value of the principal.(4) Long-term instruments, on the other hand, involve heightened uncertainty as the rate of inflation, and with it the variability of inflation, increases. Even small fluctuations in the rate of inflation can bring about, through their effect on nominal interest rates, fairly large changes in the market value of long-term instruments.

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(1) These results are subject to the usual caveats on the quality of flow-of-funds data. In particular, personal-sector investment in condominium housing is excluded from the estimate of tangible asset accumulation in the existing framework; no account is taken of the capital gains component of land transactions; and the amount of RRSP and RHOSP saving included in the deposit category exaggerates to some degree the shift to greater liquidity.

(2) Similar results have been obtained in studies of U.S. experience. See Phillip Cagan and Robert E. Lipsey, The Financial Effects of Inflation, NBER General Series no. 103, 1978.

(3) See D. Levhari and T.N. Srinivasan, "Optimal Savings under Uncertainty", Review of Economic Studies, Vol. XXXIV(2), April 1969.

(4) This type of portfolio shift is relevant to earlier discussions of the determinants of the interest receipts of the personal sector in Sections 3 and 4.

To summarize, uncertainty about future rates of both unemployment and inflation appear to have exerted a positive influence on personal saving in the period since 1970. The rising trend in aggregate unemployment rates, the increase in unemployment duration, and the increased volatility of both absolute and relative prices, are all factors that can be presumed to have promoted increased personal saving during this period. The view that precautionary motives have played an important role in recent savings behaviour is supported by flow-of-funds data indicating both a rapid acquisition of financial assets by the personal sector during this period, and a substantial shift to more liquid assets in the composition of personal-sector financial portfolios.

## 6.5 Recent Behaviour of the Personal Savings Rate

The preceding discussion of the various determinants of savings behaviour gives the general underpinnings of the behavioural increase in the personal savings rate since 1970. The greater uncertainty stemming from the increased volatility of inflation rates appears to have led to a positive response in personal saving. This was reinforced by similar uncertainty on the unemployment front, and by an attempt to restore the real value of financial assets that were being progressively eroded by a partially unanticipated inflation. The rate of return on saving was subject to several opposing influences during these years, some resulting from inflation itself and others from changes in the tax system. There is a general presumption that rate-of-return effects exerted a negative force on personal saving during this period, although there was clearly a significant incentive throughout the period to channel saving into tax-sheltered instruments such as RRSPs. Any negative effects of rates of return on saving appear to have been more than offset by the wealth and uncertainty effects described.

## 7. CONCLUSIONS

The central hypothesis examined in this paper is whether there exist causal links between the rate of inflation and personal saving that can contribute to an explanation of the dramatic rise in the personal savings rate in recent years. The evidence presented in the paper lends general support to this central hypothesis. A number of specific linkages of inflation to the personal savings rate are examined which point to the fact that the impact of high rates of anticipated and unanticipated inflation on personal saving has been very significant in the period since 1970. The specific linkages through capital, labour and housing markets are estimated to have accounted for slightly more than one-half of the increase in the average personal savings rate between 1962-1970 and 1971-1979.

The distinction made in the paper between the effects of anticipated and unanticipated inflation is important for interpreting the significance of the rise in the measured personal savings rate since 1970. To the extent that the higher measured savings rate results simply from additional premiums built into net interest receipts in the presence of fully anticipated inflation, a divergence is created between measured and real personal saving. The increase in the measured saving of the personal sector, as a net creditor, is exactly offset in these circumstances by a reduction in the measured saving of net debtor sectors, leaving real saving in the economy unchanged. Only that part of the increase in the measured personal savings rate that is not attributable to interest premium effects can be considered as having affected real demand in the economy. The estimates presented in the paper indicate that while the measured personal savings rate increased, on average, by 3.8 percentage points between 1962-1970 and 1971-1979, the real personal savings rate may have increased by only slightly more than 2 percentage points between these two periods.

In the latter part of the paper, more general types of behavioural response in personal saving are examined in terms of the standard economic theory of consumption and savings decisions. Three main types of behavioural effect are discussed, involving responses to changes in real personal-sector financial assets, changes in real rates of return on saving, and changes in consumer sentiment. The evidence presented supports the view that, despite a number of opposing influences, these general behavioural effects provided an overall stimulus to increased personal saving during this period. With respect to their additional impact through these more general types of behavioural response, high rates of unanticipated inflation and high variability in inflation appear to have sustained high rates of personal saving through their effect in both eroding real personal-sector wealth and undermining consumer confidence. The tax treatment of saving, high rates of unemployment and various demographic trends are also identified as factors that contributed to the rise in the personal savings rate during the 1970s.

## APPENDIX A

### Estimation of Inflation-Induced Premiums in the Net Interest Receipts of the Personal Sector

Denote the real rate of interest as r, and the expected rate of inflation as $\dot{p}^e$. Assume that the nominal interest rate adjusts to inflationary conditions by a factor $\alpha(\alpha > 0)$ times the expected rate of inflation. Since $\alpha$ represents the effect of $\dot{p}^e$ on the average nominal rate earned on both new and outstanding assets, $\alpha$ will generally differ from unity even where the nominal rate on new assets adjusts exactly and without lags to changes in $\dot{p}^e$.

In these circumstances, nominal interest receipts in year t, $I_t$, can be expressed as:

$$I_t = (r + \alpha\dot{p}^e_t)A_{t-1} \qquad (1)$$

where A represents the interest-bearing assets held by the personal sector. Expanding (1), and introducing an additive random error term $u_t$ with zero mean and constant variance to the equation, yields:

$$I_t = rA_{t-1} + \alpha(\dot{p}^e_t A_{t-1}) + u_t \qquad (2)$$

The regression equation (2) is fitted to annual data from 1963 to 1978. In the fitted equation, the variable I takes the values of the total interest and miscellaneous investment income receipts of the personal sector in each of these years. These data are obtained from the National Income and Expenditure Accounts, Cat. 13-201. The variable A takes the values of the total interest-bearing assets held by the personal sector in each of these years. These are obtained from data for sectors I, II and VII contained in the Financial Flow Accounts, Cat. 13-002, and net out stocks, foreign investments, claims on associated enterprises, and estimates of currency holdings from the total financial assets reported for these sectors. The variable $\dot{p}^e$ is constructed as a five-year expected inflation rate based on an autoregressive moving average of past inflation rates.

The fitted regression equation using ordinary least squares is:

$$I_t = \underset{(0.005)}{0.047}\, A_{t-1} + \underset{(0.067)}{0.321}\, (\dot{p}^e A_{t-1}) \qquad (3)$$

$$\bar{R}^2 = 0.99$$
$$DW = 1.70$$

and the elasticity of I with respect to $\dot{p}^e$, calculated at the sample means, is 0.23. Assuming symmetry in the reaction of nominal interest earned on assets and nominal interest paid on liabilities, to changes in the expected rate of inflation, the elasticity estimate from equation

(3) also applies to the net interest receipts earned on the net interest-bearing assets of the personal sector. The symmetry assumption also allows net interest receipts to be estimated as total interest receipts multiplied by the ratio of net interest-bearing to total interest-bearing assets. The net interest-bearing asset series is readily obtainable from flow-of-funds data.

An estimate can now be obtained of the effect of a change in the expected inflation rate on the estimated net interest receipts of the sector. The constructed series for expected prices indicates that the average expected rate of inflation increased from about 2.7 per cent in the period 1963-1970, to about 6.5 per cent in the period 1971-1978. The expected inflation rate thus increased by a factor of 1.41. The product of this factor, the estimated elasticity, and the estimated average net interest receipts of $4.8 billion for the personal sector in the period 1971-1978 yields the $1.6 billion annual estimate of average additional inflation premiums presented in the text.

## APPENDIX B

### Explanation of the Treatment of Housing Transactions in the Personal Sector of the National Accounts

Denote personal disposable income derived from non-housing transactions as Yo, and personal outlays for items other than housing as Co. Following the definitions set out in Section 5 of personal-sector housing transactions, denote gross paid and imputed rents on the personal-sector housing stock as GR, and the associated space expenses as SE. The personal savings rate, s, can now be expressed as:

$$s = \frac{Y_o + (GR-SE) - C_o - GR}{Y_o + (GR-SE)} \qquad (1)$$

$$= \frac{(Y_o - C_o) - SE}{Y_o + (GR-SE)} \qquad (2)$$

where (GR-SE) is net paid and imputed rent as defined in Section 5. The expression (Yo - Co) is measured saving from non-housing transactions, so that the only effect of personal-sector housing transactions on measured saving is through space expenses, SE. Since SE appears with a negative sign in the numerator of equation (2), higher space expenses lead to lower measured saving. SE also appears with a negative sign in the denominator of equation (2) - leading to lower measured personal disposable income - but since Yo - Co < Yo + GR, the overall effect of higher space expenses is to depress the personal savings rate.